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ENDOTHELIOMA OF THE OVARY[1]

WITH REPORT OF A CASE OF HEMANGIO-ENDOTHELIOMA PERIVASCULARE

BY CHANNING W. BARRETT, M. D., CHICAGO

THE purpose of this paper is to review the literature of Endothelioma of the Ovary, and to report a case studied by the author. If, in addition to any light this study may throw upon the subject, anything is developed which aids to a more definite and accurate classification of endothelioma in general, or if any new observation is made as to the origin and mode of development, it will have served a double purpose. I have felt the more impelled to this work by reason of the scant attention which has been given the subject in American and British literature. Only five cases have been reported in the English language, this making the sixth.

Tumor growth is but the outward or gross manifestation of cell activity and arrangement. The character of the tumor, as well as its classification, depends upon the histogenesis of the cell, and its morphology and arrangement when given, by some unknown cause, an impetus to multiply. When the exact etiology of tumors is known, less stress may be laid on the histogenesis of the cell as a means of classification, but at present our conception of any tumor is based largely upon the origin and characteristics of the cell from which it sprang. Embryologically, the so-called endothelial cell is conceded to be of mesothelial origin, but in the *gastrula* stage of the ovum, only the *ectoderm* and *entoderm* exist. Largely from the entoderm, but possibly somewhat from the ectoderm, according to Minot, Heissler, Böhm and others, the mesoderm develops.

These authors describe the cœlom as being formed by clefts in the mesoderm, and this later forming the large body cavities. The bordering mesenchymal cells become flattened and epithelial-like, to form the lining of these cavities. The investigations of Budge and Sala also show that lymph-spaces and vessels are created by fissures in the mesenchyme, the most internal cells of which form the endothelium.

Von Recklinghausen published his discovery of the lining cells of the lymph-vessels in 1862. No doubt due to the poorer staining qualities of the endothelium of the blood-vessels, they were discovered later. In 1866, His first used the term "endothelium," and employed it to designate the cells lining all body cavities not admitting air. Later, Ranvier extended its use to include the cells lining lung alveoli. Eberth applied the term "perithelium" to the outer endothelium-like membrane of the blood-vessels of the brain and cord and other so-called perithelial organs, of which the ovary is one. This does not refer to the perivascular lymph-spaces of His, which are still outside the perithelium.

Sala's researches indicate the practical identity of the endothelium of the blood and lymph-vessels and that of serous cavities. Delamere is of like opinion. Minot distinguishes between the two by calling the former endothelium and the latter mesothelium. In his later work he speaks of the epithelium of the pleura, pericardium and peritoneum. He is not alone in

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this. Szymonowicz and Stöhr, in fact, call all cells-lining, blood- and lymph-vessels, bursal and articular sacs and serous cavities, *epithelial* cells.

Heidenhain, Hamburger, and Ranvier show that the endothelial cells possess a secretory function and take part in the elaboration of lymph, secrete hyaline and amyloid substance and mucin, thus further simulating the epithelial cell. Orth has found the giant cells developing from the peritoneum, and, as pointed out by Zeit, Borst, and others, the endothelial cell is capable of producing connective tissue, granulation tissue, epitheloid cells, and intercellular cement substance. This, then, is the character of the cell with which we are dealing in endothelioma — of mesoderimic origin, a modified mesenchymal cell, such as forms the connective tissue around it, retaining its ability under certain conditions to behave like a connective tissue cell, yet morphologically like an epithelial cell, acquiring at least some of the functions of the epithelial cell.

A priori, we would say that such a cell would produce a tumor of mixed characteristics. Investigations have substantiated this reasoning. The efforts of authors to recognize the histogenesis of the cell and the tumor have given us such nomenclature as endothelial sarcoma (Fischer and Cramer), sarcoma endotheliale (Rindfleisch), sarcoma plexiforme (Ewetzky), alveolar sarcoma (Billroth), angiosarcoma (Waldeyer, Kolaczek, and Hippel.)

Their efforts to take cognizance of its morphology give us epithelioma of serous membrane (Robin), endothelial cancer (Schulz), carcinoma endotheliale (Hansemann), adenoma endotheliale (Hansemann.)

Recognition of the histogenesis and morphology have led to an endless variety of names, such as connective tissue cancer (Neumann), sarco-carcinoma (Böhme), carcinoma sarcomatosum (Sattler), carcinoma sarcomatodes endotheliale (Hansemann), etc.

It is doubtful if this wilderness of classification can ever be cleared up until pathologists recognize that they are dealing with a cell that is not wholly a connective tissue cell or wholly an epithelial cell, but rather one which has characteristics entitling it to be considered a distinct cell, and that therefore its tumors are entitled to separate classification by reason of the polymorphism which they show as an inheritance from the cell.

Borst has led the way by defining the endothelial cell as a morphologically and functionally modified connective tissue-cell, specially differentiated as a distinct cell, and includes under endothelial cells all those lining blood- and lymph-vessels, lymph-spaces and serous cavities. Zeit is of like opinion, and in a discussion of this subject, classifies tumors as follows: First, epithelial tumors (malignant and benign); second, endothelial tumors; third, connective tissue tumors (benign and malignant); fourth, teratoid tumors. This would seem to lead to greater uniformity of classification of the tumors under discussion.

The origin of these tumors later known as endotheliomata, was first pointed out by Köster. This was verified by Recklinghausen. The first detailed description of these tumors was made by Kolaczek. He collected sixty observations made upon tumors arising in blood-vessel walls, none of which, however, referred to the ovary. The term *endothelioma* was first used by Golgi in 1869, since which time it has come into common although not universal use, to designate tumors growing from endothelial cells. The term *perithelioma* was introduced by Amann to signify tumors arising from the cells which Eberth has termed perithelial cells.

Leopold, in 1874, reported the first case of this class of tumors of the ovary, but applied the name "lymphangioma cystomatosum." Five years later, Marchand reported two cases. A case here and there was reported during the next decade. Pick, in 1894, made the first detailed study of this class of ovarian tumors, and divided them, from a morphological standpoint, into three classes: First, those having an alveolar arrangement; second, those having a columnar arrangement; third, those having a tubular or glandular arrangement. My specimens, as well as others, show that these may be simulated in one tumor. Amann (Jr.) during the same year, made a careful study of the subject and collected nine cases from the literature, to which he added five cases of his own, the largest number reported by one writer up to that time. Later in the same year, Cullen

gives us the first case reported in the English language, to which he applies the name angiosarcoma, saying that these tumors are frequently called endothelioma.

In 1896, Guffroy reported one new case and enumerated those found in the surgical literature, making sixteen cases. Pollak, in 1898, made a critical study of the subject and reports one new case. He was inclined to reject Müller's case but accepted as true cases those of Leopold, Marchand I. and II., Ackermann, Olshausen, Flaischlen, Eckardt, Pormorsky, v. Verlits, and v. Rosthorn. This enumeration overlooks Amann's cases and those of Cullen and Pick. In 1899, Henrotin and Herzog reported the second authentic case in this country.

Three years later, Apelt reviewed the subject and found some cases which had been previously overlooked, which, with his own case, nearly doubled the previously reported cases. Since Apelt's study of the subject, notable contributions have been made by Stauder, Papaïoannou, Barbour, Glockner and others. Stauder, writing on the subject of ovarian sarcoma, cites six cases, but the report on these is rather brief and incomplete. Many European writers have enriched the literature with a report of cases during the last five years; these, together with one reported in America by Lincoln, making about one half of all cases reported.

Following in chronological order is a list of all the cases found in literature to the present time. For the efficient and invaluable aid rendered in this bibliographical research, I wish to thank Dr. Carl von Klein.

1873–1874.

LEOPOLD (G.). Lymphangioma cystomatosum. Autopsy upon an 8-year old girl, who died of marasmus. The tumor, weighing 16 lbs., contained numerous cavities lined with cylindrical epithelium. The connective tissue had undergone a peculiar change. It contained numerous fine fissures lined with endothelial cells. The endothelium had proliferated in many places into bud-like growths. Many of the fissures were entirely filled by heaps of endothelium, and the walls of the cyst were perforated occasionally by proliferation of the connective tissue and endothelium. Leopold attributes the processes of proliferation in the connective tissue to torsion of the pedicle of the tumor, and believes that the endothelium was derived from the lymphatics. The size of the tumor was 36x26x19 centimetres and its relatively small weight was owing to the inner structure having so many cavities. The microscopic examination decided the designation of the tumor as lymphangioma cystomatosum.

1879.

MARCHAND describes two cases. *Case* 1. Endothelioma of the lymphatics, 48-year old patient. Both degenerated ovaries entirely removed, together with a metastatic tumor as large as a hazelnut adhering to the fimbriated extremity of a tube. Patient recovered from the operation, but died two years later of an affection of the spinal cord. It was without doubt due to metastatic growth. Of the two tumors, one was solid and the size of the fist, the other the size of a head, occupied for the greater part by a cyst. The stroma of connective tissue showed numerous fissures which were lined with endothelial cells. The endothelium was proliferating and formed masses of cell groups which in form resembled the carcinoma cones. The stroma showed myxomatous degeneration. The cells showed much hyaline degeneration. Through expansion of the lymph-spaces many cysts were formed.

Case 2. Endothelioma – tubulose. Patient 60 years of age. The tumor found in a congenital inguinal hernia. Size of the tumor 14x10x9 centimetres; showed tubes of endothelial cells. These tubes were intermingled with connective tissue which formed a tunic around the spiral cell cylinders. Hyaline degeneration was noted.

1882.

ACKERMANN describes a case. Age of patient not stated. The tumor consisted principally of a meshwork of net-like capillaries; the structure of its walls was really of capillaries, but they were not filled with blood corpuscles; they were either empty or closed up with round cells. The spaces between these capillary rafters were also mostly vacant, but occasionally were filled with an albuminous substance, or they contained cell elements in various groups; in the vicinity of the exterior walls of the vascular canals they were more spindle-shaped than round. The tumor was an endothelioma intravasculare. The other ovary was normal and healthy. In the glands of the retroperitoneal space, secondary symptoms were visible.

FLAISCHLEN. Endothelioma of lymphatics. Patient 37 years old. Ovariotomy. Marked ascites. Tumor of the left side, very hard and adherent, size of a child's head. One half of the upper surface of the tumor was covered thickly with a papillary growth; the other half was covered with peritoneum. By cutting through the tumor two cysts were exposed, separated by a thick dividing wall and containing a thin liquid. In the larger cyst was found another smooth cyst about the size of a plum. The tumor cells are thought to have their origin in lymph-spaces.

1886.

OLSHAUSEN (R.). Endothelioma intravasculare. Cites a case of a 17-year old patient, much emaciated. Presented an immovable abdominal tumor as large as a man's head, and having the appearance of a multiloc-

ular tumor. An incision through the abdominal walls demonstrated the impossibility of extirpation. Patient died nine days later. The tumor consisted mainly of a net-work, with shape and arrangement similar to that of a capillary net-work, the width of whose capillary strands equals that of a capillary. The structure of these strands offers proof that they really are capillaries, which are either empty or filled with round cells. The interspaces are empty or filled with a homogenous (probably albuminoid) mass. These cells are partly spindle-shaped, partly round. The tumor was accordingly an endothelioma intravasculare. The other ovary was normal. The right lobe of the liver contained a tumor (5x3 cm.) which was composed of a loose tissue resembling a child's brain, and had a tumor zone at the periphery. Secondary changes were also discovered in the retro-peritoneal glands.

1889.

ECKARDT (C. TH.). Endothelioma intravasculare. Reports case in a patient aged 46 years, with a tumor weighing 4,200 grams. It was solid and movable, uterus enlarged to the third month of pregnancy. The tumor as well as right ovary was removed, but patient died on the fourth day with continual vomiting. Post-mortem examination showed the intestines greatly distended, the serosa moderately injected, but free from peritonitic exudate. The entire pouch of Douglas was filled with a partly clotted, partly fluid mass of blood; kidneys small, flabby, anæmic; fatty degeneration of the epithelium; heart very flabby, in advanced stage of brown atrophy. Cause of death obscure.

1890.

POMORSKI (J.). Cites two cases of endothelioma of the ovary. *Case* 1. Endothelioma lymphaticum. A tumor as large as a man's head, weighing 10 lbs., was removed in sections from an 8-year old girl. The smooth, knotty surface was surrounded by the serosa, and consisted on the incised surface of a reticular stroma in which appeared many large and small cysts filled with a secretion, in some instances clear, in others dark. Under the microscope there showed a number of various sized, many cornered tubes, which possessed a soft membrane composed of spindle cells, and surrounded by a single-layer cylindrical epithelium. These tubes at first began small and formed a small mass of round cells, but without any cavity. The larger tubes showed collectively a real cavity, which was filled with detritus or cells. The latter formed a large swollen body of cells, having a clearly defined small nucleus, the whole having the form of a round ball. The connective tissue of the stroma consisted of long fasciculus of fibres. Between these were fissures opening lengthwise, provided with a tender, single layer of endothelium,which in rapid growth threw off budding shoots, forming new layers of cells, which in turn filled and widened the lymph-spaces.

Case 2. 49 years old. Multipara; complained of a heaviness in the right side and had lately lost weight. Last menstruation fifteen months previous. A compact elastic tumor had formed in the pelvis. On the surface of the tumor, at the right, hard nodules were perceptible. In the right side of the pelvis, the tumor was immovable and was completely isolated from the uterus. Laparotomy. Ovariotomy of the right side. By the loosening of the pelvic adhesions, the tumor was torn and a small quantity of foul, yellowish matter was exuded, which congealed as it cooled. Portions of the intestines sloughed off, and more of the intestines were torn in pieces the size of a quarter; repaired with catgut. At the junction of the tumor with the small intestines, malignant degeneration was apparent. Time of the operation 35 minutes. Patient died three days later of pus peritonitis.

VELITS (DESIDERIUS VON.) Lymphangio-endothelioma. An unmarried woman 24 years old and much emaciated. Suffered for nine years in consequence of a constantly growing tumor of the left ovary. For four months confined to her bed; strength greatly reduced. Laparotomy. Tumor showed various and far-reaching growth. Death one and one-half hours after operation. Post-mortem examination not permitted. The tumor, the size of a man's head, showed an exterior smooth and shining, and was composed of white, dough-like protuberences, varying from small to the size of a fist. Under the microscope the tumor showed myxomatous cystic degeneration, but was very different from the glandular cyst of the ovary. It had rather the peculiar characteristics of angiosarcoma, and was plainly a growth from the lymphatic vessels.

1891.

ROSTHORN (VON.). Endothelioma perivasculare. Case with an ovarian tumor taken by Chrobak from a 48-year old patient, resembled in all particulars an equally enlarged ovary. Slides showed microscopically the structure of the normal, small, incysted, degenerated ovary. It seemed to be composed of a thick, fibrous groundwork, enclosing many alveolar cavities, which were separated from the surrounding connective tissue by a sharply defined line. These were filled with closely packed epithelial, cubic cells, not very large and possessing little protoplasmic substance. In these groups of cells were lacunar cavities, some of which held healthy red blood corpuscles, and others shriveled fine-grained masses. It is to be noted that there are round spaces in the midst of the alveoli, whose structural contents are probably a degenerate product of the cells. The whole tumor, consequently, represents an endothelioma, which issuing from the so-called perithelium of the blood-vessels, is to be designated as endothelioma perivasculare.

1892.

MÜLLER (V.). Endothelioma cysticum. Age of the patient not given. The tumor had a cyst the size of a child's head, having many chambers and being much mangled. The exterior for the most part smooth; only occasionally a rough, rugged surface. In some places were the remains of earlier adhesions. The cyst consisted of one principal chamber and many secondary ones. Incisions in the wall of the principal chamber showed a structure devoid of lamellæ. In the thin parts

of the wall of the cyst were found many cavities and fissures with epithelial cells. The thicker parts of the wall (3 cm.) were formed of thick, fibrous connective tissue with epithelial elements. In spite of some doubtful considerations, this case, with greatest probability, can be designated as an endothelioma of the cyst wall.

1894.

AMANN (JR.). Five cases. *Case* 1. Endothelioma perivasculare. Patient 29 years old; complained many months of loss of blood from the genitals. Pains intermittent in the abdomen. Examination showed very small uterus, anteflexed. At the right of the uterus a tumor the size of a man's fist, circular in form and of a consistency mostly hard, but in some places having an oscillatory movement. Laparotomy. The tumor was taken from the small pelvis after exact ligation of the pedicle in four parts. It showed only slight adhesion to its environment. The left ovary was normal and was permitted to remain. Recovery in a few weeks. *Microscopic examination:* With high power the neoplastic cells could be defined as mostly circular or oval, lying close together without perceptible intercellular substance. The cell nuclei were unusually large and filled with cells.

Case 2. Patient 64 years old. Examination showed a tumor lying transversely over the navel, whose surface showed irregular protuberances. Operation disclosed a double tumor with numerous adhesions. Removal very difficult and the patient lived only a few hours. Tumor showed a mass of cysts of various sizes, some holding serous matter and others degenerated blood. Incisions in the wall showed it to be much thicker than the ordinary ovarian cystoma. Microscopic examination showed that the outer covering of the cyst-spaces was layers of oval, almost spindle-shaped cells, diminishing in size at the border of the lumen. From here radiated columns of cells in all directions, even going directly over into the spongy structure; this itself consisted of a convolution of crossing and re-crossing cell columns, which were formed of round or polygonal cells. The arrangement of the columns in the structural tissue gives rise to the supposition that they have usurped the spaces of the lymphatics.

Case 3. Patient aged 48 years. Hæmangio-endothelioma intravasculare. Laparotomy. Removed 2 tumors weighing each 870 grm. Recovery. These were solid, each the size of a child's head, and composed mostly of a spongy, soft mass. *Microscopic examination:* In a strong, prolific, connective tissue stroma, columns of cells were imbedded which formed central cavities. The cells were arranged to radiate from a common center. Moreover, fine tubes were discernible, of which one side showed normal endothelium, while on the other multitudinous spindle cells were heaped. From the contents of the tubes can be seen that the proliferation was formed from the endothelium of the capillaries.

Case 4. Patient 25 years old. The left ovary, lying in an inguinal hernia, had, in two months, changed into a tumor the size of a small pear and having a very irregular surface. Operation removed the same. Recovery. Tumor solid, composed of a red, soft mass. Microscopic examination showed the stroma strongly infiltrated so that it was difficult to discover the alveolar position of the neoplastic cell masses. The endothelium of the blood-capillaries was in rapid proliferation, but no connection was shown between them and the neoplastic cell masses. All pointed to the great probability of the tumor being an endothelioma intravasculare.

Case 5. Endothelioma lymph., 7-year old child, having "gigantic tumor." Laparotomy showed much metastasis. Was removed; was very soft, and incisions showed great quantities of blood in its composition. It also contained many cysts filled with a watery fluid. Microscopic examination showed that it was composed mostly of masses of spindle and giant cells in tubular form. Endothelium was nowhere found. But as the arrangement of the cell forms resembled the course of the lymphatics, the tumor might be declared to be an endothelioma lymphaticum. This diagnosis was upheld by finding leukocytes in the interstices of the tubes.

CULLEN (T. D.). Perithelioma (endothelioma perivasculare). Reports a case of a woman 48 years of age. Menses normal until January, 1894. Married 20 years, two children, youngest 12. With onset of profuse menstruation in January a tumor was noticed over pubes. Operation July 7, 1894. Patient discharged September 3. Tumor was found on the left side of the uterus closely adherent thereto. Uterus was found involved by extension and apparently by metastasis. The right tube and ovary appeared normal. Ovarian tumor shows coagulation necrosis. Diagnosis; angiosarcoma, which Cullen says is rare and is usually called endothelioma. He speaks of two sources; those from blood-vessels and those from lymph-vessels.

PICK. Reports two cases. *Case* 1. Endothelioma lymphaticum. A patient 48 years old, unmarried. Dropsical symptoms. Diagnosis; solid ovarian tumor left side (carcinoma? sarcoma?). Laparotomy; removed a tumor the size of a child's head from the left side together with 8 liter ascites. Dismissed cured. Four weeks later removed ascites. Exploratory laparotomy disclosed the peritoneum covered with small knots. Patient died after three punctures. Tumor solid, and showing yellowish-white when cut. The right ovary showed the same conditions. Microscopic examination showed a fibrous stroma with no remains of the left ovary. Columns of cells sharply defined, with new, oblique fissures towards the end. They were partially covered with endothelium, which in certain places was proliferating. The blood-vessels contained normal endothelium and were surrounded by more or less perfect tumor cells. As the examination showed that the lymph-spaces were the starting point of the abnormal growth, the tumor was designated as endothelioma lymphaticum.

Case 2. Patient 26 years old, one year married. Diagnosis; sarcoma of an ovary. Removal from left ovary tumor size of man's head, slightly adhering to abnormal wall. The right ovary was not enlarged and was allowed to remain. Retains health until discharge of a vaginal abscess. Four months later the right ovary was enlarged to size of a goose egg, but

regained normal size. Microscopic examination shows in the fine fibrous stroma chains of cubic or round cells, arranged in parallels and having well-colored nuclei. The tumor was declared to be an endothelioma lymphaticum, determined by the proliferation of the lymph-spaces and glands.

VOIGT (M.). Lymphangio endothelioma. Voigt removed an ovarian tumor from a 16-year old girl. It was from the left side, of the size of a man's head and completely enclosed in adhesions. It showed a fibrous capsule, with fibrous trabeculæ running towards the center. Cells having their origin from the epithelium of the lymph-passages were seen. This tumor was designated as endothelioma lymphaticus. As regards the hyaline degeneration of the principal substance, it answered to the cylindromas as described by Virchow and others. In the above case, the tumor seems not to have been malignant, since it was formed at least two years before the operation, and the patient up to the present writing, three months, has had no relapse.

1896.

FABRICIUS (J. F.). Endothelioma of the lymph tract. Woman 40 years old. Removal of the large tube, containing a decomposed mass, with the enlarged ovary of the right side. One year after the operation, in perfect health with the exception of a fistula. Inspection of the tumor disclosed that the decomposed mass was induced by the enlargement of the ovary to the size of a hen's egg. Under the microscope the capsule showed hyaline degeneration. It contained minute fissures with endothelium that encroached upon the large polygonal cells. Some of the fissures spread and were filled with one or more rows of neoplastic cells. A certain diagnosis cannot be ventured. Probability points to its being a tumor springing from the endothelium of the lymph-spaces.

KÖTSCHAU. Endothelioma of lymphatic origin. Patient 54 years old, suffered nine months. Severe pains increased rapidly. Laparotomy; removal of two ovarian tumors; from the right ovary, size of a child's head; from the left ovary, size of a man's head. Death 14 days afterward, in consequence of ascites and great difficulty in breathing; inanition.

The tumors showed multitudes of local cysts which held quantities of detritus. Microscopic examination shows the connective tissue degenerated and holding epithelioid cells. The epithelium of the lymphatic tract was already proliferating. Numerous layers of cells were variously grouped. Blood or its traces was nowhere discernible. Diagnosis; endothelioma, but without decision as to whether the tumors were lymphatic or intravasculare. Kötschau favors the former theory with R. Krukenberg, as the lymph-space endothelium was plainly proliferating.

RIBBERT. Two cases. *Case* 1. Endothele of lymph-vessels. Patient 21 years old. Tumor size of a man's head filled the entire pelvis; was of a hard, rigid consistence. Pressure from the exterior forced the tumor into the vagina. Diagnosis, malignant ovarian tumor. Cœliotomy; the tumor was hard and uneven. At the right side, the colon was grown so closely to a hard tumor the size of a potato, arising from the right ovary, that a piece of intestinal wall had to be cut away. The tumor was also so closely connected with the back and side walls of the pelvis, that the entire front peritoneal coat of the rectum and the flexura was obliged to be severed. Total extirpation of the uterus with both ovaries. Death of the patient. Microscopic examination shows the tumor was composed, for the most part, of narrow rows of cells which were imbedded in a stroma of connective tissue. The free connective tissue showed nowhere any endothelial covering. At the same time there were small, united lymph-vessels, whose walls presented narrow endothelial tumor cells in proliferation. In isolated places of the tumor, where the tumor cells were imbedded thickly and diffusely in the stroma, they were found to be interspersed with lencocytes.

Case 2. Patient 29 years old. Diagnosis; malignant secondary ovarian tumor. Cœliotomy. A great quantity of clear ascites. The large, flat, knobby tumor arose from the left ovary. The right ovary changed into a rigid tumor the size of an apple. Extirpation of both ovaries. Recovery. *Microscopic examination:* In the peripheral zone, which was 3 cm. wide, showed dark colored portions. Closely examined, these dark colored portions showed groups of cells which were imbedded diffusely and without clear boundaries in the connective tissue stroma. Besides these cells, there were other small, isolated groups of cells (boundaries sharply defined) lying partly in lymph capillaries, whose endothelium was plainly visible, and partly in oblique rifts showing tumor cells.

ROSINSKI. Three cases. *Case* 1. Endothelioma lymphaticum. Patient 41 years old. Diagnosis; sarcoma ovarii. Operation; removal of tumor from the right ovary. After five days of normal health came a sudden relapse; death on 9th day. Left ovary much enlarged. The right ovary tumor, the size of a child's head, formed of solid cysts. The left ovary showed the same condition. Microscopic examination disclosed tissue, partly fibrous and partly sarcomatous, containing fissures with normal and abnormal endothelium. In many places the latter completely filled the clefts. Large cystic alveoli were formed of the small cells. Stroma and parenchyma were largely undergoing hyalin degeneration. Designated as endothelioma lymphaticum.

Case 2. Patient 55 years old. For four years had swelling in right side, but experienced no pain. Then a quick growth of a tumor and much pain. Laparotomy; removal of a tumor a size larger than a man's head. Restored to health. Five years later a relapse. Diagnosis, "Uterus fibromatosus." Tumor showed a multitude of local cysts, whose base took $\frac{1}{3}$ of the entire weight. Some soft knots were incorporated in the tumor. As the cell masses grew in alveolar cavities which were covered with endothelium, the designation of the tumor was given as endothelioma lymphaticum.

Case 3. Patient 39 years old. For seven weeks she had suffered from a fast growing tumor, movable and painful to the touch. Ascites. Diagnosis; carcinoma ov. Laparotomy. Removed from right ovary a tumor

larger than a man's head, and a small one. Recovery for one year and then a relapse. The right tumor was solid, of soft consistency and having a corrugated surface. By the incision there exuded from numerous irregular orifices a serous fluid. Microscopic examination showed numerous lymph-canals whose endothelium was in full proliferation. The primary tissue consisted of myxomatous stroma in which lay alveolar groups of epitheloid cells. The findings designated the tumor as endothelioma lymphaticum ovarii.

ZANGEMEISTER. Angiosarcoma. Patient 32 years old. Three children. For three months hemorrhage and great pain in the abdomen. Laparotomy; removed a tumor the size of a child's head, rigid and slightly adhering to the intestines. Recovery. After eight weeks, death in consequence of a relapse. The centre of the tumor held cavities; the capsule much perforated. Microscopic diagnosis by Arnold given as "Angiosarcoma of the right ovary with progressive necrosis."

1898.

FRÄNKEL records three cases. *Case* 1. Patient 24 years old. Examination; a tumor in the right side of the abdomen, with adherent smaller parts, plainly to be felt. Cœliotomy. Right ovarian tumor partly enclosed in adhesions. The left ovary was not perceptibly enlarged and was allowed to remain. The extirpated tumor weighed 820 gr. The upper surface was knotty and covered with transparent cysts. It consisted of a large cyst with many small cavities, the size of a walnut. The cyst fluid was of clear yellow color and contained numerous cholesterin crystals. Microscopic examination showed a glandular cavity of varied extensions surrounded by a flat endothelium without visible cell boundaries.

Case 2. Patient 29 years old. Examination shows a tumor size of a child's head in the abdomen. Operation. Marked ascites. Tumor consisted of a number of smooth-walled cysts. Contents yellow, containing cholestearin crystals. The surface of the tumor was covered with numerous hollow spaces of a whitish color. Microscopic characteristics same as Case 1.

Case 3. Patient 51 years old. Operation. Tumor large as a man's fist, consisted of one large cyst and a number of smaller cysts with hard walls containing lime. In some places the covering of the cyst walls was changed to endothelium.

POLLAK. Reports a case operated by Chrobak. Patient aged 41. Tumor with smooth surface, widely expanded, firm consistence. Operation. Median incision. A bluish-appearing cyst was punctured in the middle with a trochar and contents slowly drained off (10 liters). After the discharge of the fluid, the first incision was found too small and was enlarged by 2 cm. The left ovary was removed with the tube as the latter was clearly degenerating. Recovery. The cyst sac was larger than a man's head. The interior was uniloc-ular, although there were indications of earlier divisions and floating portions of connective tissue. The lumen of the vessel capillaries showed nothing remarkable. The small endothelial cells were intact. Endothelioma perivasculare.

TROVATI (G.) Patient 28 years of age, single, history of amenorrhœa and dysmenorrhœa. Said had had pelvic disturbances for the past six or seven months, accompanied with emaciation. Seeks relief from tumor. Examination shows a cachectic appearance and suffering. Abdominal tumor could be easily made out by external palpation. It occupied the anterior quadrant of the abdomen, slightly more to the left than right. Tumor hard, elastic and fluctuating. Diagnosis of cystoma of the left ovary was made. Operation. Abdomen was opened, and puncture of the ovary caused the escape of a liter or more of fluid. The wall of the cyst was found generally thickened, the lower portion being almost like the formation of true, parenchymatous neoplasm. Removal of a portion of the tumor after loosening it from its many adhesions, which held the mass to the small pelvis and its contents. Pedicle sutured to the abdominal wall. Patient died from peritonitis two days later. Post-mortem examination showed the left ovary transformed into a tumor the size of a man's head. Two cysts were present, a large and smaller cavity. Tumor was not entirely spherical. Two lobes could be differentiated. The right ovary was composed of a new growth of the size of a man's fist. The right tube was healthy. Microscope showed the presence of polymorphous epithelioid cells in lymphatic vessels and in the lymphatic spaces of the connective stroma. The diagnosis, endothelioma.

1899.

BURCKHARD (G.). Three cases. *Case* 1. Endothelioma lymphaticum. Patient 55 years old. One child. Clinical diagnosis, cystoma ovarii. Operation. Tumor size of man's head, showing numerous adhesions, removed. Recovery. Dismissal after 22 days. One-half year later death of patient. Microscopic examination showed tumor was composed of numerous round or alveolar cavities containing spongy, lightly colored mass, and covered with flat cells, undoubtedly endothelium. Here and there were observed the transition of the cavities into the lymphatic vessels. Diagnosis; endothelioma ovarii, with malignant metastasis. Lymphaticum might be added, as the change of the cavities into lymph-vessels is plainly shown.

Case 2. Endothelioma ovarii cysticum. Patient 54 years old. Laparotomy. Tumor larger than a man's head, weighing 13 kilograms, removed. Copious discharge of ascites. Recovery. Nothing later known. Tumor contained 10 liters of fluid. Microscopic examination showed cysts closely heaped and separated by narrow septum. These cysts contained crumbling substance, and were covered with endothelium, Some cysts were changed into fissure-shaped cavities, covered with endothelium. Numerous groups of dead cells.

Case 3. 63 years old. Laparotomy. Removal of compound tumor the size of a man's head. Death on third day. Tumor was composed entirely of cysts partly colored with blood, some of them containing a clear liquid. Showed also a number of nodules of firm consistency and of whitish color. These were mostly on the upper surface and were the size of an apple. Tumor declared to be an endothelioma.

HERZ. Endothelioma lymphaticum. Girl 14 years old. Laparotomy. Removal of a tumor the size of a man's head from the left ovary. No ascites. Recovery. Free from relapse. Incisions show gray surface and disclose a cavity the size of a walnut, with thin mucous fluid. The author designates the group of cells in the fissures of the exterior as endothelium of the lymph-spaces, and designates the tumor as endothelioma lymphaticum.

HENROTIN AND HERZOG. Report a case of endothelioma in female physician, aged 30 years. Menstruation irregular. Two years later ceased entirely. Followed in five years by hemorrhage. Laparotomy presented a tolerably soft, pedunculated tumor of the right ovary. Tumor was of grayish-white, somewhat pinkish, color, and almost spherical shape. At the greatest periphery it measured 25 cm. Epithelial cells, as an external lining, are not found. The tumor tissue proper consists of a stroma of spindle cells, very similar in character to the normal ovarian stroma cells. Between these cells are found cells of medium size, round or cuboidal, with comparatively large nuclei, rich in a finely graunlar chromatin. Recovery. No return at last information.

KRUKENBURG (F.). Endothelioma perivascular. A case of a patient, age not stated, from whom an ovarian tumor weighing 4,480 g. was removed. Microscopic examination showed that the capsule, formed of thick fibres, held innumerable cavities, all of which were empty and possessed closely defined endothel. There was no extension. The first stages of growth of the tumor were in the form of short rows of cells and cords, which seemed to have no connection with the endothel of the cavities. The cells were round or polyhydral and had large neuclei. Diagnosis: endothelioma.

MIRABEAU. Perithelioma. Patient 62 years old. Had suffered one year with great heaviness in the abdomen. Emaciation, ascites. Clinical diagnosis; malignant ovarian tumor ruptured. Laparotomy. Discharge of 10 liters of hemorrhagic fluid. Tumor, the size of a man's head, could not be removed on account of close growth. Death on the 27th day from ascites and loss of strength. Autopsy showed that the tumor had broken in the colon. The cyst wall was covered with knotty growth the color and consistency of the brain. In a much degenrated stroma showed single groups of polymorphous cells, always holding a blood-vessel in the center. The endothelium of the vessels was intact and surrounded by a hyalin degenerated media and adventita, to which was joined a mantel of radiating cells, which grew less and less as it grew away from the endothelium.

1900.

BROUHA. Endothelioma. A woman 46 years old. A dermoid combined with the tumor, which formed the image of a carcinoma or a sarcoma. Degeneration of the endothelium of the blood and lymph vessels.

HUBERT (RUDOLPH). Cites two cases. *Case* 1. Eleven-year old child. Endothelioma lymphaticum of the right ovary, happily removed. Recovery. No relapse to present time (eighteen months).

Case 2. Patient 40 years old. Removal of tumor. Diagnosis; endothelioma lymphaticum.

LINCK (A.). Endothelioma lymphaticum. Patient 50 years old. The right ovary size of a child's head, firm and hard. Surface ridged; various cysts with clear contents. The left ovary also changed into a tumor of smaller dimensions. Surface also rigid; consistence solid. Microscopic ex.; the ovary showed numerous small cysts, partly filled with flat, round cells, partly with cubic cells,. and partly surrounded with cylindrical epithel. Here and there in the connective tissue were lymph-fissures having diverticulæ which were surrounded with endothelium. The whole gland tumor was covered by a hard capsule of connective tissue.

1901.

APELT (F.). Endothelioma lymphaticum perivasculare. Patient 33 years old, regular. Pregnant six and one-half months. Removal of child 6 weeks, dead. After delivery patient felt severe pains in right side, and after three months the abdomen was greatly enlarged. Very rapid growth of tumor in the abdomen. Urination and evacuation of the bowels normal. Tumor the size of a man's head could be felt by the hand under the tender abdominal skin. Operation July 6, 1900. Right ovariotomy. Tumor solid and closely connected with uterus. Separation of the tumor and the right tube with the thermo-cautery. The stump was sewed to the lateral pelvic peritoneum. The left ovary showed no pathological change and was not disturbed. The patient at the end of one year free from relapse. The tumor capsule was intact; in only one place had the tumor cells broken through. The tissue of the capsule was infiltrated with small cells. The tumor was formed (as the microscopic examination proved conclusively) by proliferation of the endothelium of the lymphatics, and the diagnosis read, endothelioma lymphaticum perivasculare.

BRUCKNER (J.). Cites two cases. *Case* 1. Endothelioma lymphaticum. A 24-year old patient, died one and one-half hour after operation. Tumor size of adult's head, developed in the left ovary and adherent to the uterus. Incisions showed spongy structure with cavities of small dimensions containing mucous fluid. Microscopic examination showed that it was composed of cell cords, irregular in form, with lateral offshoots, changed occasionally into small cysts.

Case 2. Patient 44 years old. Diagnosis; tumor in the lower abdomen, adhering to the uterus. Operation; found tumor size of head of fœtus in left ovary; the right ovary small and irregularly lobed. Further examination disclosed two small tumors on the uterus, each the size of an acorn, having the appearance of metastasis. The tumor was totally enveloped in a fine capsule, which was covered with an endothelium, intact and lustrous, resembling the peritoneal serosa. On the tumor, immediately under the capsule, were a quantity of slight vascular ridges.

GUFFROY. Endothelioma of lymphatic origin. Patient 52 years old, married, but no children. Laparotomy. Tumor, the size of a small head, consists of a

cyst with smooth surface, showing in certain places adhesive bands. Microscopic examination shows clearly an endothelial covering. The endothelial cells are much swollen and vary in size and form. Often many layers were found rising irregularly over each other, so that the lumen of the fissures was nearly filled with them. The cystic wall consisted of connective tissue without an ephithelial covering. An endothelioma having its origin in the lymph glands.

HAAKE. Endothelioma lymphaticum with symmetrical cell groups. A case of a peculiar compound tumor, 31-year old patient. Tumor reaching from the right side to the costal arch. This showed sarcomatous and carcinomatous structure. The origin from the endothelium of the lymphatics was plainly to be noted. Other parts would have masses of clear, well-defined cells enclosed in dark-colored masses of syncytium. Syncytial groups lay also free in blood-spaces.

LANGER. Endothelial tumor. Patient 50 years old. Myoma of the uterus. The uterus and the adnexa removed. The right ovary somewhat enlarged, consisted of reddish-white masses of knots. *Microscopic examination:* In a distended, sarcomatous stroma were spaces or fissures ranging from small to middle size. In the larger were found smooth cells. In the lumen were complex sarcomatous cells. Spaces were noted in which knotty growths from the stroma intruded, which at the terminus usually held a group of sarcomatous cells, all inferences pointing to the tumor as an endothelioma.

WIEDERSHEIM. Endothelial lymph sarcoma. Describes a case of endothelioma of the ovary. Patient 40 years old; died of peritonitis. Tumor the size of a goose egg, hard and rough, was taken in sections from the left ovary. The growth was partly solid and partly of small cysts, interspersed with large cavities. The structure of the cavities bespoke of lymphangioma cysticum, but this was contradicted by the lack of newly formed lymphadenoid tissue. And again, numerous microscopic views seemed to prove that the tumor had its origin in the endothelium of the lymphatics, particularly the transformation of this endothelium of the lymph-glands into the sarcoma tissue.

1902.

ABADIE (M. J.). Endothelioma (sarcoma). Patient 36 years old. Examination; at the left a soft, mobile tumor; at the right a resistent tumor. Operation; at the left was found a tumor independent of the uterus. Removal of the tumor and the external portion of the tube. At the right was found a tumor of the same form and weight, but firmly connected with the parietal peritoneum and adhering to many intestinal loops. Microscopic examination shows no trace of the ovary was to be found. Many granulations upon the peritoneum. The character of the tumor, its rapid development, the solid consistence, the great ascites and the adherences, together with the microscopic appearances of the lesions at certain points, seems to indicate the sarcoma, but they are also in favor of the endothelioma.

FRANQUÉ (Otto V.). Patient 51 years old. Examination; abdomen much distended by large tumor lying to the left. Consistence partly cystic and partly solid. At the right, behind the uterus, a second resistent tumor was felt, the size of a small head. Seemed not to be in direct connection with the first. Laparotomy, May 25, 1900. Death by heart failure, May 27th. The operation was rendered very difficult on account of the tumor being connected on all sides (and in some places very strongly) with the forward abdominal wall and with the neighboring intestines; these difficulties being augmented by the brittleness of the tumor itself. The right ovary, which was completely atrophied, remained behind, as well as the uterus. Left ovarian tumor, widely extended and very irregular, so badly torn that a correct estimate of its size cannot be made. There was a subperitoneal extension of the tumor beyond the region of the tube.

GODART. Endothelioma lymph. Patient 47 years old, unmarried. Examination indicated two large tumors of elastic consistency occupying the greater part of the small pelvis. Operation; a clear, lemon-colored ascites, having no flakes of fibrin. Left ovary was the size of two fists, and had only slight adherence to the intestine. The right tumor was smaller, being only the size of one fist. Microscopic examination shows tumors of connective tissue, having their origin in the proliferation of the lymphatic endothelium. This is the variety of sarcoma which, on account of its origin and the form of its cysts, is to be designated endothelioma or cylindroma. A relapse is almost certain.

JONNESCO. Perithelioma. Abdomen greatly enlarged, with presence of ascitic fluid. A large hard tumor could be vaguely outlined, apparently an ovarian cyst, which had been observed for the first time about a month ago. Patient complained of pain in the iliac fossæ, and a sensation of constriction of the epigastrium. Operation, March 19. Upon opening the abdomen, a large quantity of ascitic fluid escaped. The omentum was found enlarged and thickened, and transformed into a large, irregular mass adherent to the adnexia. Complete resection of the omentum. The ovaries were transformed into tumors presenting the same hardness and irregular aspect as the omentum. They were the size of a small orange. The tubes were flexed and enlarged; small white nodules were found in the pelvic peritoneum; peritoneum of the abdominal cavity not affected. Total abdominal hysterectomy was performed. Microscopic examination of the tumor indicated it to be a perithelioma. The prognosis was reserved for this reason. (No detailed mention of microscopical findings.)

SOUBEYRAN (PAUL). Patient 48 years old. Diagnosis; papillary cyst of the right ovary. Great ascites. Laparotomy. Five to six liters of ascetic fluid of a yellow cast. A large part of an intestine, dilated and red, with some tubular granulations, traversed the line of the incision. Other gray granulations, commencing to turn yellow, were found on the parietal peritoneum. Removal of tumor from left ovary, having numerous protuberances and short pedicle. The right ovary was normal. No hemorrhage. Patient died nine days after operation. The tumor was oval and the size of a child's head at birth. The surface was diversified by

large, irregular lobes; the consistence of the lobes was hard; some contained a clear liquid; they were enveloped in a resistent capsule. The tube was connected with the tumor. The tumor tissue was compact and firm.

STAUDER (ALFONS). Six cases of endothelioma ovarii. *Case* 1. Endothelioma lymphaticum. Patient 39 years old. Examination showed a mobile tumor at the right of the uterus, size of a fist, knotty and hard. To the left a smaller tumor, characteristics the same. Diagnosed as carcinoma ovarii and peritonei. Operation, July 1894. The peritoneum and also the liver were covered with white, hard nodules, the size of a hazelnut. Recovery. Microscopic examination shows normal ovary entirely gone. In a connective tissue stroma, whose beams were of varying thickness, ran darkly colored cell fibres, which were probably an effusion of the lymphatic system. In numerous places was the beginning of myxomatose degeneration of the cells of the tumor. As this progressed, the typical structure of the tumor disappeared, giving place to a mass of degeneration. Described as endothelioma ovarii lymphaticum cum degeneratione myxomatosa.

Case 2. Endothelioma with malignant metastases. Patient 55 years old. Operation, September, 1899. Recovery. Dismissed on 22nd day. Microscopic diagnosis, endothelioma with malignant metastases.

Case 3. Endothelioma lymphaticum. Patient 37 years old. Examination: at the right, behind the uterus, a hard tumor the size of a child's head. Second examination, January, 1898; tumor shows a cystic development; otherwise unaltered. Operation, February, 1898. Free ascites. The upper surface of the tumor, as well as the inner surface of the peritoneum, covered with hard nodules the size of a bean. Also in the region of the small pelvis, compressible nodules. Further examination showed the tumor to be connected with all the organs of the small pelvis. Exudation from all parts of a rather thin, yellowish fluid, mixed with blood. Clinical diagnosis; compound tumor, malignant, with extended carcinoma of the peritoneum. *Microscopic examination:* Only a few portions have a real alveolar construction. Most of them are round and spindle-shaped tumor masses, not united in large groups, but lying in single rows between the fibres of the connective tissue of the stroma. In many places the tumor cells are so dispersed in the interstitial tissue that it resembles a sarcoma with intwined, fibrous, intercellular substance. Diagnosed as endothelioma lymphaticum.

Case 4. Endothelioma ovarii cysticum. Patient 63 years old. Extirpation of both ovaries. Death 50 hours after the operation. *Microscopic diagnosis:* Endothelioma ovarii cysticum.

Case 5. Endothelioma ovarii cysticum. Patient 54 years old. Operation, July 14, 1898. Recovery. Dismissed August 3d. *Microscopic diagnosis:* Endothelioma ovarii cysticum.

Case 6. Perithelioma ovarii cysticum with degenerations. Patient 53 years old. Operation, May 4th, 1898. Extirpation of colossal tumor. Weight 93 pounds. Recovery. *Microscopic diagnosis:* Perithelioma ovarii cysticum cum degeneratione myxomatosa.

1903.

LANGE. Endothelioma with metastases. A case of endothelioma in an unmarried woman aged 41 years, on whom laparotomy was performed. A cyst was removed from the left side. The right ovary appeared to be normal and healthy, and was allowed to remain. The recovery was uninterrupted. Five months later, the patient was in ill-health, suffering from abnormal conditions in the chest, diagnosed as pleuritic effusion which pointed to tuberculosis or metastases. Nothing in the history of the case indicated the former. There were repeated chest and abdominal punctures to withdraw the accumulated fluid, but the patient failed rapidly and in a few weeks died of apparent pulmonary embolism. Necropsy showed the right ovary enlarged two-fold, and the vesicle and parietal peritoneum, especially in the region of the right broad ligament, studded with numerous metastatic knots of grayish color. Microscope showed them to be endotheliomas. The same was true of the right ovary and corroborated the diagnosis of ovarian endothelioma with widespread metastases.

LINCOLN (W.). Endothelioma. Patient's age not stated. Removal of a right ovarian tumor. Microscopical examination showed pronounced glandular hypertrophy and great hyperplasia. The tumor of the ovary, where *in situ*, on superficial examination, was thought to be a papillomatous cyst with a broken-down interior. It had a fairly firm consistence until it was accidentally ruptured during its removal. Immediately a mass of poorly formed, very friable tissue extruded through the rent, and a very severe and sudden hemorrhage occurred. The interior of the tumor was made up of small cells, whose nuclei almost filled the cell body. These cells were in places arranged in such a way as to suggest the attempt at the formation of tubules or vessels. The cells appeared to be packed together without any intervening tissue, but were not arranged in alveoli, as in carcinoma. Numerous small vessels were found directly among the cells, and the walls of the vessels were formed by the cells themselves. No return of the growth can be detected by careful examination.

SCHÜRMANN. Endothelioma ovarii lymphaticum. Patient aged 27 years. Married 6 years. For the last 14 days had felt an increasing pressure in the abdomen. Examination revealed a tumor the size of a child's head, attached to the right side and uterus. The tumor, which was incased in adhesions, was removed. The patient was discharged in 22 days. Until the 16th day there had been a rise of temperature until it had reached 38.7 C. Examination showed the tumor to be of two portions. The first part was flat, and of the size of a half dollar, and had a bronzed appearance on the upper surface. The second part, on the contrary, had a normal-appearing cyst-wall. A manifold system of small lymph-fissures, whose endothelium was seldom normal and was mostly a morbid growth, which, by the escape through the lumina spread itself in the surrounding connective tissue. The second part showed a structure of wide lymph-canals in a nearly unchanged connective tissue, whose

endothelial coverings was mostly without peculiarities, but in certain places showed great cell processes under development. The new growth, according to Schürmann, had its origin in the lymph-spaces of the lymph system. He remarks that the pure cystic forms are very rare.

1904.

FEDERLIN (L.). Endotheliomaintravasculare. Patient 52 years old. Married 30 years; no children. The operation disclosed a cystic tumor the size of a child's head over the symphysis, and to the left a second tumor having two protuberances, reaching above the navel. Both tumors were diagnosed as cystosarcoma or carcinoma of the ovaries. Each one was taken separately. It was evident that both ovaries were in a condition of cystic degeneration before the forming of the tumor. The tumor from the right ovary was 14 cm. long and nearly 7 cm. wide. A larger tumor from the left ovary was 11 cm. long and 7 cm. thick, the latter very irregular in form, having many inequalities. The microscopic examination of the right ovary, probably the first formed tumor, since it was solid, leads to the conclusion that the cysts were first formed here. Many fissures in the surrounding connective tissue showed repeated groups of tumor cells, such as were found in both ovaries. There was one such group of cells combined with red blood corpuscles surrounded with endothelial cells, lying as in a capillary gland.

GRAEFE (M.) cites two cases.

Case 1. Endothelioma lymphaticum. 44 year old patient, mother of three children. From 1894 to 1895 she was confined to her bed with a thrombosis of the right leg. Diagnosis; large cystic tumor in the small pelvis, formed of ball-shaped segments. Operation. Recovery. The new growth was attached to a medium thick layer of partially normal and partially swollen connective tissue, in which with the microscope was seen here and there glandular tissue. The large, irregularly formed nuclei of the cells were darkly colored. The cell cords were in rows of two or three, many of them spindle-shaped. Oblique and diagonal incisions disclosed oval, round, and pestle-shaped cell masses, enclosed in narrow and broad fasciculi of tissue, which seemed to indicate alveoli.

Case 2. Endothelioma perivasculare. Patient aged 48, unmarried. Hitherto healthy. In October, 1896, felt a pressure in the abdomen. In November, abdomen much enlarged, feet swollen. Examination showed marked ascites and unmistakable resistance in the abdomen. Operation, February, 1897. A copious flow of bloody pus followed the incision in the abdomen. A large bluish ovarian cyst was found to the left, slightly adhering to the abdominal wall. Microscopic examination disclosed multitudes of blood-vessels of various sizes. Capillaries were mingled with others which possessed large lumen. Here and there they were thickly heaped. Other narrow portions of the normal connective tissue or epithelial cells separated them. Occasionally large blood-spaces, very irregular in form, were seen. While the endothelium of the vessels sometimes remained intact, they were found mostly in the lacunæ or gaps. In many cases the latter are surrounded by epithelioid cells. The transformation of the endothelium into the latter could be traced. The small, narrow nuclei gradually became larger and rounder, until they took on the more circular form of the tumor cells. According to the foregoing, the tumor, is to be designated as a perithelioma or endothelioma perivasculare ovarii.

HEINRICIUS. Endothelioma lymph. Patient 32 years old. January, 1901, tumor size of a child's head was removed intact. Physician reported the cause of death, cancer of the abdomen. The extirpated tumor was enveloped in a smooth capsule and did not adhere to surrounding organs. There were no cystic cavities. Slides were stained with hematoxylin and eosin, and later with Van Gieson's stain. The capsule surrounding the tumor was 2 to 3 mm. thick, and consisted of connective tissue, poor in cells and in some parts fibrous. In one part of the tumor the neoplastic cells had taken a cylindrical form, having a cavity in the middle, filled with liquid lymph. Microscopic examination showed a proliferation of the endothelia in the lymph-vessels of the connective tissue, which were carried into the lymph-capillaries and lymph-spaces, nearly filling them. The large spaces filled with endothelial cells are undoubtedly lymph-spaces and not blood-vessels.

KROMPECHER (E.). Endothelioma. Patient 46 years old. Right ovarian tumor. Operation. No metastases. Capillary structure. The cyst and fissures are filled with necrotic substance. There were growths also of epithelial sprouts, epithelial nests, and papillary connective tissue, together with numerous blood-vessels and margins of from 8 to 12 layers of cells. Also granular growth of cells in the form of thin tubes, whose walls consisted of one or two layers of cells. At such points are found hyaline degeneration of connective tissue, which is surrounded by single layers of endothelium, in form resembling a cylindroma.

PAPAÏOANNOU. Cited three cases. *Case* 1. Endothelioma perivasculare. Patient 42 years old. Diagnosis; right ovarian tumor, endometritis hemorrhagica. Tumor the size of a man's head, was in the form of an enlarged kidney. The tumor itself showed large and small groups of cells, and columns in patches of cells, which in round or irregular form were imbedded in a stroma of connective tissue. These groups contained numerous blood-vessels, whose endothelium was surrounded by neoplastic cells. In the stroma there were also numerous blood-vessels, whose intima was formed of intact endothelial cells. With a high power lens a gradual passing of these groups or patches into the stroma could be seen.

Case 2. Endothelioma. Patient 46 years old. Examination showed near the normal uterus, on the left side, a mobile tumor, as large as the fist and hard to the touch. Cœleotomy. Tumor arising from the left ovary removed. The other organs showed no change. Recovery. Tumor nearly spherical, diameter 14 cm. Surface smooth, with few ridges, consistence solid. The fimbria was connected with the tumor. The tumor rose from the large and pathologically changed ovary.

One section, 5/6 cm., taken from the periphery, shows a thick layer of dense connective tissue, forming a capsule for the real tumor tissue. To that is attached the stroma of connective tissue, which holds many oval lumina surrounded by endothelial cells.

Case 3. Endothelioma. Patient 52 years old. Examination shows a tumor to the left of the uterus, consistence hard in some places and at others elastic. Operation. Removal of the left ovarian tumor, which was connected with the sigmoid flexure. The other ovary did not seem to be enlarged and was permitted to remain. Recovery somewhat hindered by a pneumonia. The tumor resembles in form that of Case 1, namely, an enlarged kidney.

POLANO (OSCAR). Describes five cases. *Case* 1. Endothelioma lymphaticum. Patient 42 years old. Double ovarian tumor. Right tumor the size of a child's head; left tumor the size of a fist. Great ascites. Color of the tumor mostly reddish-brown. The enclosing capsule of the left tumor seems everywhere to be thin as paper. The right tumor resembles the left with the exception of a thicker wall. Microscopical examination of the left tumor; tumor imbedded in a stroma of connective tissue of numerous cavities, which are separated from the stroma by a wall of tumor cells. Microscopic examination of the right tumor shows cavities filled with leucocytes, their walls formed of narrow single layers of cells, resembling the perfect endothelium. The contents of the cavities is lymphatic fluid, with leucocytin, so that it is certainly with the lymphatic vessels that the tumor has to do. At certain points tumor tissue of many layers takes the place of the endothelial envelope.

Case 2. Endothelioma perivasculare. Patient 32 years of age. Ovarian tumor of the right side, of the size of a man's fist. No ascites; numerous adhesions; recovery. Tumor had the form of an enlarged ovary. On the upper surface were numerous protuberances of flesh color. During the operation some of these were deprived of their capsule so that in these places the tissue of the tumor could be seen. The universal color of the tumor was reddish-brown. *Microscopical examination:* The peculiar characteristic is the relation of the tumor cells to the blood-vessels. Everywhere where large or small vessels appear, their periphery is provided with a mantle of tumor cells. In the midst of the tumor, where the greatest degeneration exists, there is no real tumor growth found, rather necrosis. The blood-vessels here show distinct cell mantles.

Case 3. Endothelioma. Patient 50 years old. Laparotomy. Removed a right ovarian tumor the size of a man's fist. Left ovarian tumor the size of a hen's egg. No connection. Death half an hour after the operation. The right tumor resembled an enlarged ovary, covered with hard, flat protuberances. Between these nodules were cords of solid connective tissue. The left tumor resembled the right in all particulars.

Case 4. Endothelioma. Patient 28 years old. Laparotomy. Double ovarian tumor. Right tumor size of man's fist. Left tumor size of child's fist. Patient dismissed from the hospital; no later particulars. Left tumor of solid consistency, had many small, knotty protuberances on the upper surface. The right tumor had protuberances much larger and more numerous than left tumor. Otherwise identical. In the central part of the tumor were tumor cells of the highest grade of tissue ripeness. The malignant character of the new growth is here most plainly shown.

Case 5. Patient 56 years old. Laparotomy. Discharge of abundant clear ascites. Peritoneum slightly thickened, no adhesions. Removed a tumor size of child's fist. Surface universally smooth, showing the clear white color of the albuginea. *Microscopical examination:* The stroma is greatly œdematous. Hyaline degeneration found in places.

1905.

BARBOUR (A. H. F.). Endothelioma lymphaticum. Patient 42 years old. Admitted to the Royal Infirmary. Examination showed abdominal distension more prominent on the right side, and palpation revealed two tumors of firm consistency, with nodular surface, freely mobile. They occupied the iliac and lumbar regions, and passed into the pelvis. Their consistence and well-defined outline suggests a uterine fibroid but no souffle is to be heard. On the other hand, there is no distinct evidence of ascites, indicating a malignant character. The uterus is to the front but not movable. Nodules on the left side of the cervix. An incision was made into the peritoneal cavity, showing two solid ovarian tumors with small amount of ascites. The right tumor was larger and showed recent adhesions, which were easily separated, but there was difficulty in securing its broad pedicle. On removal of the tumors the peritoneum was seen to be thickened by a malignant infiltration. The patient died on the fifth day following the operation. Microscopical examination shows the tumor cells to be developed from the lymphatics.

BELLATI (CESARE). Female, aged 35, peasant, married. First menstruation at the age of 14; regular. Married at 20. Four children, the youngest three years old. Had observed a growth in abdomen in inferior right quadrant about a year ago. Was first inclined to think she was again pregnant. Paracentesis was performed six months ago; discharge of fluid; repeated a month later. No pain or fever had been observed during all this time. Color of the skin pale; muscles quite flabby, fat scarce. Temperature of body normal, urine normal. Palpation revealed an ovoid tumor in the lower right quadrant, extending to umbillicus and to the left as far as linea alba, below where it meets with Poupart's ligament, occupying the whole right iliac fossa. Not able to outline the tube and ovary. Return of nodule two months after operation. Removed; recovery.

GLOCKNER (ADOLPH). Endothelioma. Patient 48 years old. Abdomen swollen, with a circumference of 88 cm. Clinical diagnosis solid ovarian tumor. Operation, March 12, 1901. To the right of uterus a tumor the size of a man's head, and to the left a tumor the size of a child's head, corresponding to the location of the ovaries. Extirpation of the tumor. Operation, April 4, 1901. As the microscopic examination showed conclusively the malignant nature of the tumor, it was

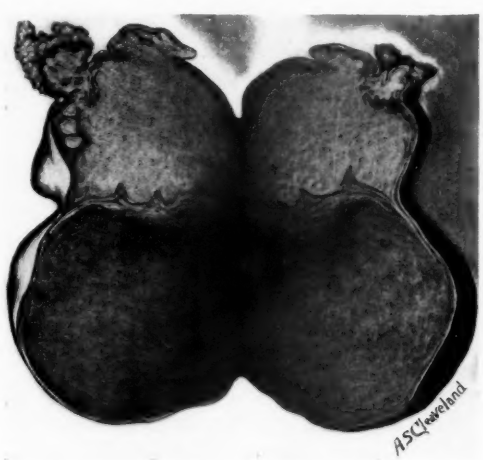
necessary to extirpate the uterus. At the opening of the Douglas cavities there was a flow of dropsical fluid. Laparotomy showed so strong a growth of the intestines, to the left wall of the abdomen, that an operation was declared impossible. Death June 25, 1901. The tumor of the right side, of irregular oval form, having a surface of protuberances and knots. Tumor of the left side irregular, with large protuberances. The microscopic views of both tumors differed little and only in non-essentials.

1906.

SCHMAUS. Endothelioma. Reports an autopsy on a patient aged 49, which revealed disseminated new growths of the character of endothelial cancer, from the size of a linseed to that of a pea. The omentum was extensively affected by these growths and exhibited a structure which was to a very great extent identical with that of chorion epithelioma. In a strict sense, however, the general condition did not agree with the presence of true chorion epithelioma.

1907.

BERNSTEIN (H. A.). Reports a case of lymphangio-endothelioma of the ovary, in a girl 17 years of age. Family history negative. Menses at 14, regular. Seven months ago patient began to have pains in the abdomen and noticed an enlargement. Patient anæmic, poorly nourished and looked to be 6 months pregnant. Enlargement somewhat irregular. Tumor found impacted and lying to right of the uterus, and attached to right broad ligament. Only slight ascites. Tumor 7x5x5½ inches. Weight 3½ pounds. Microscope showed lymph-spaces dilated and filled with cells which showed no tendency to extend beyond the lymph-space. Recovery from the operation, with no return when last seen, 3 months after operation.



Longitudinal section of tumor, showing smaller solid, and larger degenerated portions.

Area of tumor showing blood-vessel walls dividing tumor-cells into apparent alveoli. A few Krukenberg cells, and numerous Russell-Plimmer bodies are seen (x175).

To these cases found in literature, I wish to add the following case, occurring in my consultation practice, for which I am indebted to Dr. F. E. Stevens, of Bristol, Wisconsin.

History of Patient. Mrs. N. B., age 37, admitted to hospital June 19th, 1905. Father and mother living, ages 87 and 71 respectively. Three sisters living and well. The family history entirely good, except that one uncle on the father's side died of cancer (supposed). Previous health and strength have always been good, except the patient has had attacks of measles, mumps, and a severe attack of typhoid fever five years ago. First menstruation appeared at the age of 11, 28-day type, regular. Painful until the first child was born. Three children, 10, 4, and 2 years of age. Labors difficult, last two deliveries instrumental. Had moderate lacerations and complains of having had some prolapse of the uterus for years. No history of other pelvic trouble until the onset of the present trouble. Patient began to complain of a weighty, distressful feeling in the pelvis six weeks ago, but continued her usual household duties and suffered no extreme pain. She thinks she caught cold at the time of the menstrual period six weeks previous. During menstruation two weeks previous to entering the hospital, had severe vaginal irritation and thinks she had inflammation of the vagina and uterus. Pain severe. The pain over the abdomen has persisted, most marked in the right inguinal region. One month previous to admittance had severe diarrhœa and clay-colored stools; no nausea at any time. During the onset of the pelvic trouble, two weeks previous to admittance, she was examined by Dr. Stevens, who found moderate thickening and con-

siderable tenderness in the right side of the pelvis, seeming to involve the ovary and tube. During the intervening two weeks between this and admittance to the hospital, she was repeatedly examined and the mass was found to be enlarging rapidly, to such an extent as to suggest an inflammatory mass. The pelvic pain increased rapidly and the administration of anodynes became necessary.

Examination verified the history of perineal laceration and found a left inguinal hernia. The vagina appeared normal, the uterus slightly enlarged and crowded to the left and a large tender mass was made out in the right side of pelvis. Chart shows the pulse ranging from 100 to 104; temperature 98½ to 100.2 before the operation. The blood examination was as follows:

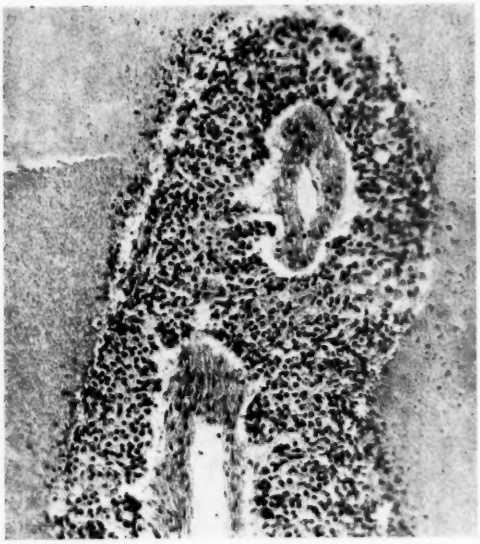
Erythrocytes	4,200,000
Leucocytes	7,800
Hemoglobin	80 per cent

Urinary examination showed no albumin, no sugar, no blood, a few hyalin casts, urea 1.4 per cent.

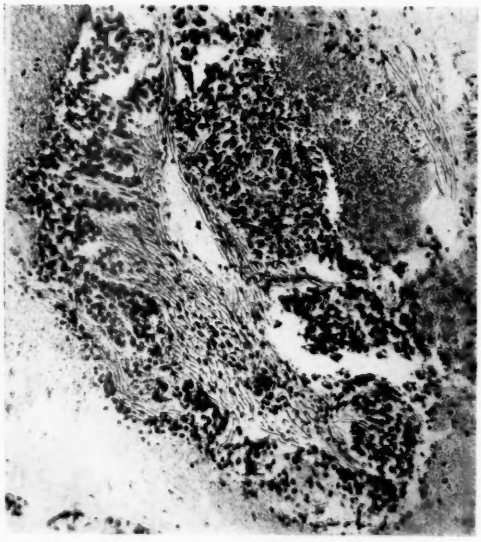
The Operation. Under chloroform and ether anæsthesia, the patient was subjected to a cœliotomy, median incision. A moderate amount of dirty sero-hemorrhagic fluid escaped. The peritoneum was injected. Tumor mass in the right hypogastric region. Omentum and other surrounding structures slightly adherent to the tumor. Tumor attached to the posterior surface of the right broad ligament, and seeming to replace the ovary. All adhesions were separated without difficulty and the tumor was lifted out of the abdomen, when, as a result of the great friability, it broke from its attachment to the broad ligament and the uterus. Infiltration had involved the tissues beyond the point of rupture, and it was thought best to remove the uterus, the broad ligament, and the opposite ovary. Before the operation was completed, its futility was apparent. Nodules the size of a pea were found low down on the perimetrium, the peritoneum, the pouch of Douglas, and close search revealed scattered nodules upon the peritoneum of the mesentery and the small bowels. The blood-vessels so much in evidence, a soft, yet friable tumor, the rapid onset of symptoms, together with the metastases found, led to the conclusion that an early return was to be expected, and in this we were not mistaken.

The operation was well borne and the patient made a usually good recovery from the operation itself. She was never comfortable, however; always complaining of pain, always wanting morphine. She left the hospital four weeks after the operation, but during the latter half of her stay in the hospital she developed conditions which were remarkable for their rapidity. She complained of the hernia giving her trouble, which it never had done while lying in bed. Examination revealed a walnut-sized mass of tumor growth in this region. The nurse reported a sanguinous-purulent discharge from the vagina. Examination revealed a large ulcerated condition in the vagina. A persistent cough developed, suggesting metastases.

I am indebted to Dr. Stevens for the information

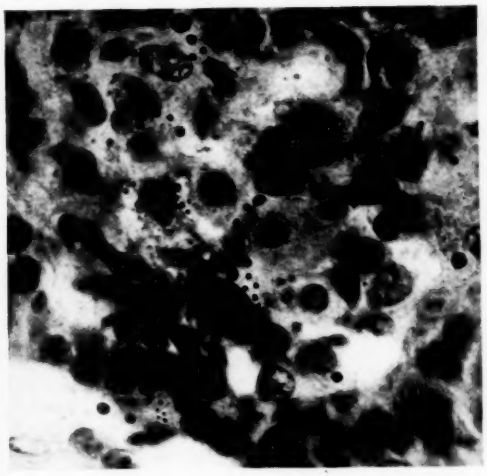


Cross- and longitudinal section of blood-vessel with intima intact, media increased, and a typical mantle of tumor cells (x125).



Oblique section of blood-vessel, with branches surrounded by a tumor-cell mantle (x125).

A tumor area of cells in apparent alveoli, cords and chains, with interwoven blood-vessel walls and muscle fibers (x45).



Large cells with much protoplasm and so-called Russell-Plimmer bodies (x825).

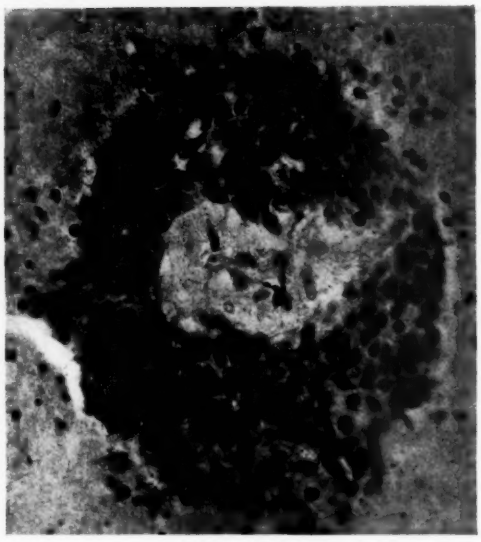
regarding the patient after her return home. The pain increased rapidly, making the use of opiates necessary. Tumors varying in size from that of a pea to that of a walnut appeared in the vagina, the inguinal region, on the chest and legs. She died two weeks after leaving the hospital. No necropsy was obtained.

THE GROSS TUMOR.

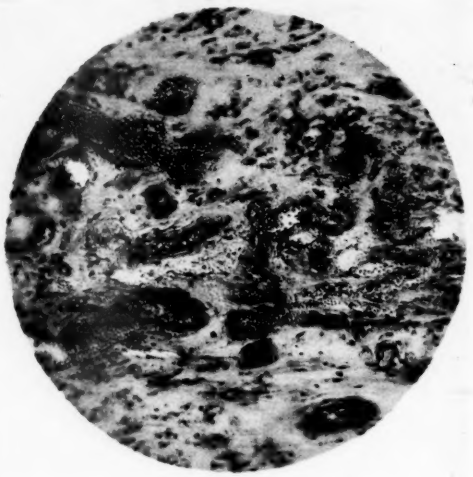
The specimen is an irregular ovoid with a constricting ring marking the external junction between a larger, soft cystic portion, rounded, smooth and degenerated, and a smaller portion, solid, friable, and irregular. The tumor measures 15x10x8½ cm. and weighs 750 grams. At the smaller end the tumor presents a nodular appearance and a ragged area, where it was evidently attached. The remaining portion of the tumor presents a dull, smooth or slightly roughened surface; in color it varies from a pale, waxy yellow to dull, dirty gray, glistening gray in areas, reddish brown spots and streaks, bluish-gray and pinkish areas, and dark blue and red streaks marking the line of blood-vessels. Hemorrhagic areas of degenerated blood are seen here and there. Cut longitudinally the tumor presents two distinct portions, the larger rounded encephaloid portion of the tumor is seen to consist of a capsule 2 to 3 millimeters thick, enclosing the soft, jelly-like contents, which, at the distal portion, was broken down but grows more solid toward the junction of the two portions of the tumor, and becomes adherent to the capsule. A distinct trabeculum of closely packed fibrous tissue separates the two portions of the tumor, and is continuous with the inner portion of the capsule of the degenerated portion. The solid part of the tumor consists macroscopically of a capsule friable in places, which is continuous with the outer portion of that covering the degenerated part of the tumor. Here and there hemorrhagic spots and areas are seen on the cut surface. The large part of the cut surface presents a light or dark grayish appearance and a slightly roughened surface, and the structure is of a spongy consistency.

MICROSCOPIC EXAMINATION.

The microscopic findings are based upon observations made upon numerous slides cut from the surface and centre of the solid portion, and from the junction of the solid with the cystic or degenerated portion, and from the capsule of the degenerated portion. Specimen was preserved in 4 per cent aqueous and alcoholic solution of formaldehyde. Specimens were imbedded in celloidin and stained with eosin and hematoxylin and Van Gieson. The tumor was found to consist of a connective tissue stroma, an intermingling of a variable amount of muscle cells, a rich supply of blood-vessels, blood outside the vessels filling large and small spaces, tumor cells filling large and small areas, and lastly, degenerated product. The capsule of the degenerated portion of the tumor is found to consist of an outer firm connective tissue zone, and an inner vascular zone of tangled, engorged blood-vessels, surrounded by connective tissue. The same capsule is continued over the solid portion of the tumor, but with a less marked vascular zone, except in areas. The capsule is interwoven with the deeper structure. No epithelial cells are found covering the tumor. The solid mass is made up of connective tissue stroma and tumor cell areas, about evenly divided. No ovarian parenchyma is seen. The blood-vessels and blood extravasations are a marked feature of each of these areas. Arteries, veins, and capillaries are seen



Cross-section of blood-vessel with marked degeneration of vessel wall. A few red blood corpuscles showing in the center and a tumor-cell mantle outside the vessel (x350).



An area of tangled, engorged blood-vessels near the surface (x125).

in abundance in the connective tissue areas; highly vascular surfaces are noted in which occlusion of blood-vessels and extravasations are observed. In these areas fibroblasts are numerous. Different fields are here seen in which the red blood cells have an arrangement very similar to that of the tumor cells in other areas.

THE TUMOR AREAS.

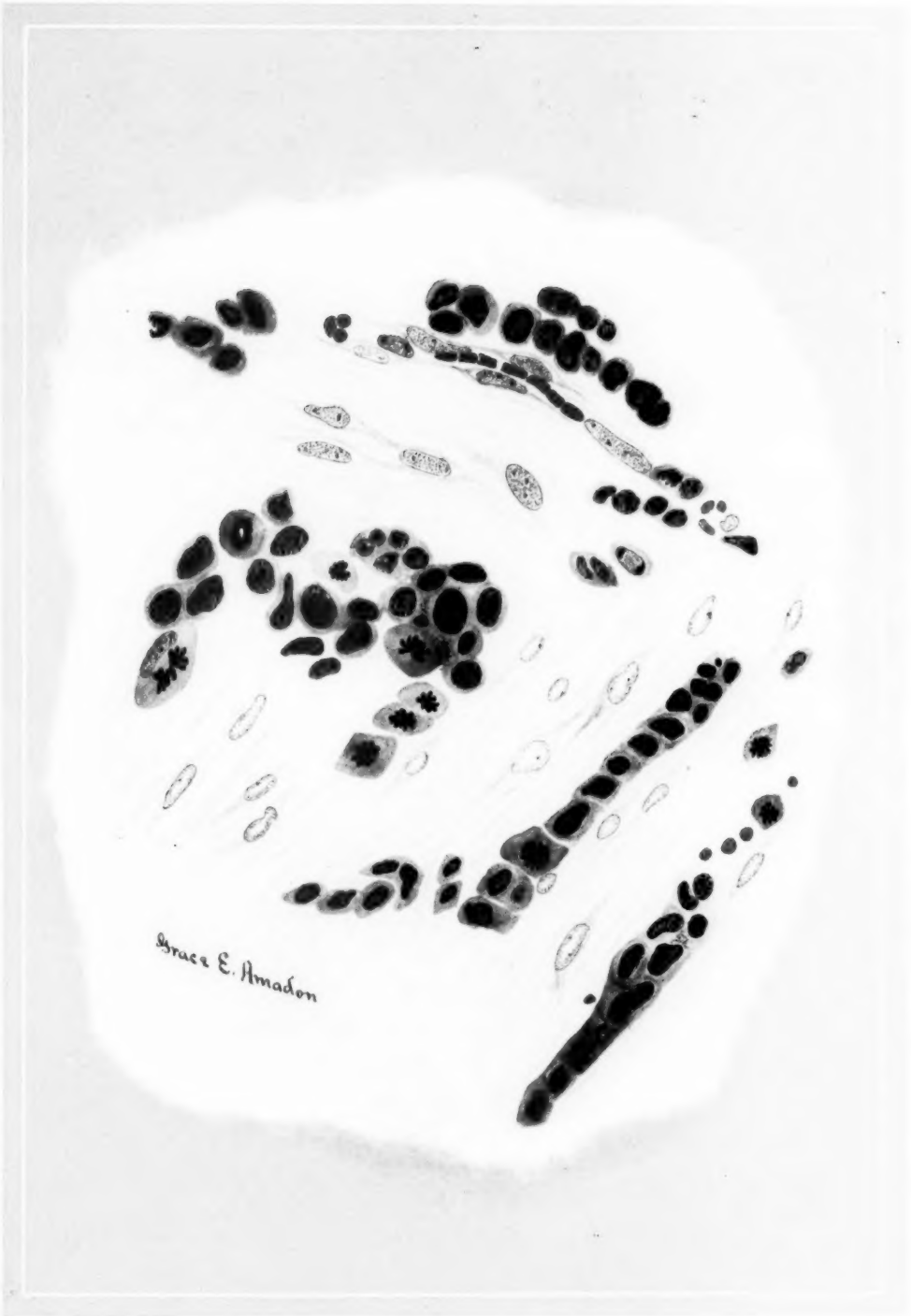
The characteristics of the tumor areas are marked cell proliferation, arrangement of cells around blood-vessels, obliteration of blood-vessels, extravasation of blood and degeneration. The slides cut from the tissue at the junction of the solid and degenerate portion of the tumor show a fibrous separation of the two portions of the tumor. The dead tissue fails to take the stain, but shows faintly occluded blood-vessels, cell mantles, and extravasated blood debris. Advanced live areas show large extravasations, with here and there large or moderate sized blood-vessels, seen in cross and longitudinal sections, with the intima intact; with cell mantles 8 to 10 or more cells in thickness. All connective tissue, small blood-vessels and small cords of tumor cells have disappeared. Other fields show tumor cells apparently in alveoli, in thick cords and single chains. Cords having a tubular appearance are also seen.

The morphology distinctly resembles carcinoma in places. Other fields resemble sarcoma. The perivascular arrangement seen in advanced stages suggests strongly hemangio endothelioma of the perivascular variety. A careful search has been made for earlier changes to clear up this apparent polymorphism. Areas were found in which fingers of cells were reaching out into new tissue; in some cases chains of cells were found following up minute blood-vessels. At first these observations indicated that the cells were intravascular, and this led to greater confusion. It was difficult to reconcile the apparent intravascular origin with the perivascular arrangement seen in advanced stages. I have been fortunate in finding a series of slides which show the perivascular beginnings of these cells, and which explain the alveolar arrangement which makes the tumor simulate a carcinoma, and which also demonstrates the manner in which the large blood spaces are formed. Fine cords or single chains of tumor cells have been observed, radiating from blood-vessels between which are distinctly noted the involuntary muscle fibres branching off from the larger vessel which is seen to be the remains of an obliterated arteriole, showing the perivascular nature of the growth, even in the beginning.

It is here interesting to note that the rod-like neuclei of the involuntary muscle cells of the vessels are seen to have their long axes arranged parallel with the long axis of the blood-vessel, contrary to the usual arrangement.

Numerous observations demonstrate that the alveoli, which in places so simulate a carcinoma, are but the perivascular cell mantles thrown into alveoli by parallel and branching vessels, the remains of the vessel walls forming the apparent stroma throughout the field. Radiation of blood-vessel walls are seen branching from large vessel walls like the limbs from a tree. These vessels anastomosing throw the tumor cells into alveolar arrangement.

The tumor cell mantles form distinct cords if allowed to follow blood-vessels for any distance without the vessel branching. Two or more of these running parallel sometimes simulate a tubular arrangement.



Microscopal drawing showing karyokinetic figures, fingers of tumor cells, angioblasts forming blood-vessels, and fibroblasts.

Areas are seen surrounded by blood-vessels with their cell mantles, with small vessels running out from the larger one, followed by the cell cords. In the center of the area, where the cell cords have not reached, the capillaries are seen distended with blood, and extravasation is marked. Other slides, cut deeper from the same block, show the tissue in this area dead, and a large space filled with tissue debris and extravasated blood. Thus do we see the origin of the large blood areas which form so prominent a feature of the tumor. New formation of blood-vessels, tumor cell formation along their walls, occlusion and obliteration of blood-vessels from encroachment of tumor cells, cutting off the nourishment to outlying areas, extravasation and death is the rôle that is enacted again and again. It is certain that this is what has occurred in the larger degenerated portion of the tumor.

THE TUMOR CELLS.

Not only in the arrangement of the cells does the tumor display its polymorphous nature, but in the cells themselves. They are distinctly outlined from surrounding cells, even groups of three or four cells standing out sharply when isolated by the stroma. They vary in size, in staining qualities and in amount of protoplasm, to such an extent that the extremes present fields of quite a different appearance. Areas are observed in which the tumor cells appear to be young and present a rounded or cubical or slightly irregular outline, which is seen distinctly in places, and lost in others by the crowding of the cells. These cells present sharply outlined non-vesicular or slight vesicular nuclei varying in chromatin and nuclear bodies, some staining very dark, some only moderately so. The nuclei are round or oval, or slightly irregular, and occupy a large part of the cell. The protoplasm stains slightly with eosin and presents a pinkish, glassy border around the nucleus. Here and there a cell is seen that has a small, deeply staining, bead-like nucleus, with a large amount of protoplasm. In the above described areas, the cells show much activity, and may be seen forming finger-like projections reaching out along blood-vessels in single cords or chains. Groups of only a few cells, or even single cells, are seen in advance of the column. In many places throughout the tumor mytotic figures are seen, but in these areas karyokenesis seems to be especially active. In tracing out one cell cord, mytosis was seen in many cells and two isolated cells were seen in advance, each showing cell division. In marked contrast to these areas are found other portions of the tumor made up of large, apparently swollen cells, with large, round, or oval vesicular nuclei, taking a moderate or only slight amount of stain.

Here the cells contain a large amount of protoplasm, which in some cells stains well with eosin, while in others it reacts poorly to the stain. Granular appearances are seen in the protoplasm. Here great numbers of so-called Russell-Plimmer bodies are seen in such quantities and in such relations to cells as to suggest their being a product of degeneration. They are not seen to any extent in what seems to be the young neoplastic tissue. Here and there cells seem to have disappeared, leaving lumina. In some instances this is only apparent, close examination revealing translucent substance. These widely different pictures might suggest a mixed tumor, but we see fields where the two varieties of cells encroach upon each other, and sometimes see a strip of the lighter cells running across a field of darker cells, giving it a distinct milky-way appearance. We see also cells in gradations from one type to the other. When these larger, lighter cells are thrown into alveoli by branching blood-vessels, creating a plexiform endothelioma, they create a picture which could easily mislead one to make a diagnosis of carcinoma. These observations are the better interpreted when we remember that we are dealing with the endothelial cell.

The polymorphous character and arrangement of the cell, the cords and columns and the lumina, lead to the conclusion that we are dealing with an endothelioma. The numerous blood-vessels which are so marked a characteristic of the tumor, with the absence of new lymph structure, the growth of the tumor cells along the blood-vessels, with no apparent tendency to depart from them, lead to the diagnosis of hæmangio-endothelioma. The arrangement of the cells into mantles for the blood-vessels with an intact intima distinguishes it as hemangio-endothelioma perivasculare. The numerous large areas filled with blood, and the large infarct which forms a pseudo-cyst, indicate a marked degeneration. The rapid metastasis which has been detailed, prove the extreme malignancy of the tumor in this case.

FREQUENCY OF OCCURRENCE.

It is not to be supposed that this includes all cases seen or operated upon. Bonney, in 1904, and Kadygrobow, in 1905, describe one case each,which should be added to this list, but further than the authentic reference, the facts have not been at my disposal.

Seeger, in an inaugural dissertation, in 1888, made a study of 15 solid ovarian tumors, of which three were fibromas, four sarcomas, five carcinomas, and three mixed tumors, to which he applied the term carcinoma sarcomatosum. These I have not been able to prove.

Limnell, in giving statistics on fifty ovarian tumors, speaks of six per cent, or three, being endotheliomas, but no report of these cases other than the description of the specimens is found.

Mary A. Dixon Jones, in 1884, reported numerous cases of endothelioma of the ovary,

Dead tissue taken from the junction of the two portions of the tumor, showing that the cystic portion is organized tissue (x125).

Characteristic cords of tumor cells with small branches of blood-vessels between. Large non-staining masses of protoplasm with excentric neuclei (Krukenberg's cells), 3 or 4 in number (x125).

but the pathology and opinions expressed are too vague to warrant any conclusions.

Many writers have included endotheliomas with their sarcomas, which latter show a percentage from two to ten per cent in the statistics of A. Martin, Shauta, Leopold, Schroeder, von Braun, Olshausen, and Zangemeister.

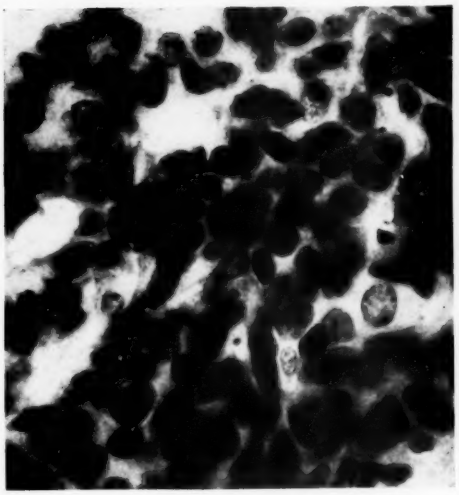
Schroeder reports finding ten sarcomas and not a single endothelioma among 600 ovarian tumors.

Von Braun found four sarcomas and not one endothelioma among 81 ovarian tumors. Olshausen reports 293 ovarian tumors, of which 12 were sarcomas and one an endothelioma.

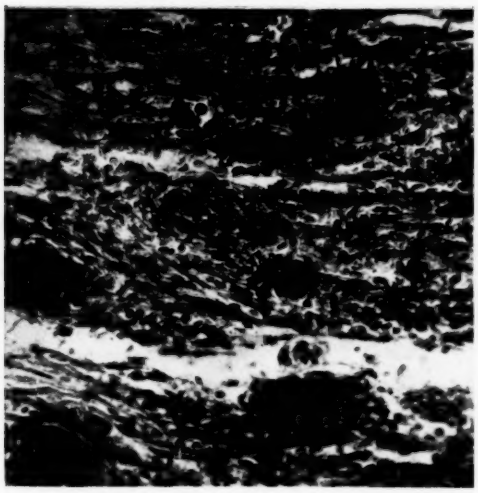
In the years between 1880 and 1893, 329 ovariotomies were performed in the surgical clinic of Heidelburg University. Examination of these specimens showed 33 to be sarcomatous. Zangemeister studied these as well as six other cases of sarcoma, not occurring during this time, and found only one case of endothelioma. This makes a total of 65 sarcomas and two endotheliomas. Zangemeister collected 33 sarcomas in 329 ovariotomies, or ten per cent. If the six cases of sarcoma represented the same percentage, they would be found in sixty ovariotomies. This, then, would make a total of 1363 ovarian tumors, among which were two endotheliomas, or fourteen one-hundredths of one per cent. More malignant cases than benign would die unoperated, so that the real percentage would be higher than the enumerated percentage. We should remember that the above examinations were made at a time when endothelioma was not universally recognized, and not so frequently differentiated from sarcomas and carcinomas. I am convinced that should this number of 65 supposed sarcomas be subjected at this time to microscopical examination to determine the origin of the tumor, they would show a much larger percentage of endothelial origin. On the other hand, our list may include a possible case or two not sufficiently proven. I have not had access to the original report in some cases, but these were in almost every case reported as endotheliomas, or as sarcomas or carcinomas having their origin in the endothelium, according to the writer's conception of the classification.

If we make the classification according to the origin of tumor cells, namely:

Lymphangio-endothelioma intravasculare,



Closely packed tumor cells in a rapidly proliferating area (x825).



Occlusion of blood-vessels and extravasation (x350).

Hemangio-endothelioma intravasculare,

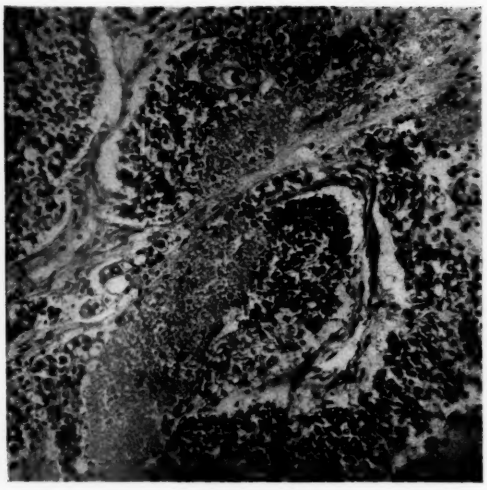
Hemangio-endothelioma perivasculare,

and endeavor to classify our cases, we meet with great difficulty. Cullen, Eckardt and others have used only two divisions, and in this classification the perivascular tumors have been classed at one time with the lymphangiomas and at another with the hemangiomas. This is the strongest argument in favor of the third division. Some have been content to make a diagnosis of "endothelioma" without further classification. This throws many cases into the doubtful class and renders it impossible to use exact figures to show the comparative frequency of the different varieties. But sufficient data is at hand to prove the greater frequency of the lymphangio-endothelioma. The perivascular tumor growing from the blood-vessel is perhaps the least common, although its classification with the other varieties at times makes this less certain. Twelve undoubted cases of the perivascular variety have been reported, which, with my own, makes thirteen.

We find that many of our cases have been reported under the name of sarcomas, being called endotheliomas as a sub-class. Some have described carcinomatous appearances. Seeger describes three cases of "carcinoma sarcomatosum," not included in this list. When an unclassified disease presents points of similarity with known diseases, leading to its being called one and then another, and then requiring both terms to properly indicate its characteristics, it is well to look at the points of dissimilarity to see if it may not be a separate disease. Studied from this standpoint, we find the endothelioma differing from carcinoma in the histogenesis and histology of the cell. The true alveoli are wanting. Apparent alveoli are formed by cells in blood- and lymph-vessels and by groups of cells separated by branches of blood-vessels. Another point of dissimilarity is the frequency of occurrence during early age.

It is dissimilar to the sarcoma in the character of the cell, and in morphology and in its tendency to follow blood- or lymph-vessels. One very distinctive feature of the endothelial tumor, and one in which it is dissimilar to either of the others, is its polymorphism. They do not correspond to our conception of either class of tumors. If we broaden our conception of these classes to include endothelial tumors, we can find no uniformity of opinion as to which class should include them; and thus confusion. I am of the opinion of Borst, Zeit, Gottheil and others that for these reasons, and the importance it may have clinically, they should stand in a separate class.

Cell mantle around blood-vessel (x125).



Alveoli caused by branching vessel walls (Krukenberg cells) (x125).

When our list of cases is studied to point out etiological factors, we find them wanting except in one particular, and this relates to age. The age is given in 80 of the 85 cases. The lowest age is 7 years, the highest 64 — both Amann's cases. Leopold's case presenting the large tumor, was only 8 years of age. The average age for all cases is 40 years. The number occurring in decades is as follows:

From 7 to 10	3	From 40 to 50	26
" 10 " 20	5	" 50 " 60	16
" 20 " 30	12	" 60 " 64	5
" 30 " 40	13		

The number occurring during periods of five years after the age of 20 are as follows:

From 20 to 25	4	From 45 to 50	15
" 25 " 30	8	" 50 " 55	12
" 30 " 35	6	" 55 " 60	4
" 35 " 40	7	" 60 " 64	5
" 40 " 45	11		

This shows the greatest number of cases in the fifth decade — 40 to 50, but if we compare the ten years from 45 to 55, we find that there is one more case than from 40 to 50. The number occurring from 45 to 50 exceeds by three that of any other five years. This is a carcinomatous age rather than a sarcomatous, although too many cases occur early in life to be exactly typical.

Heredity is not shown by our cases to have any considerable bearing upon the etiology but Eberth and Spude have reported numerous examples in several generations of a family of mice

ONSET.

We are surprised, when we study this feature of the cases, at the sudden onset. Schürmann records a case in which only two weeks had elapsed since the first symptoms presented.

Jonnesco's case first noticed a tumor one month previous. My case had had symptoms for only six weeks — marked symptoms for only two weeks. On the other hand, Velits' case had noticed a tumor for years; Zangemeister's case, three months; Rosenski's third case, seven weeks; yet a tumor as large as a man's head was found. Pain in the pelvis is frequently noted, menstrual disturbances seldom, marasmus and cachexia are occasionally seen. Marked enlargement of the tumor has led the patient to seek relief in some cases.

THE TUMORS

The tumors have varied in size from that of a walnut to that of a mass weighing 93 lbs. Most of those spoken of are compared in size with the head of a child or of an adult. Single ovarian tumors are noted in 59 cases, double ovarian tumors in 21, doubtful 5. In a number

of instances an apparently healthy ovary was left, which became involved thereafter. This is of prime importance in dealing with these tumors. They have varied from dense, hard tumors to soft brain-like masses and to cystic growth. Their capacity for rapid growth has varied much.

ASCITES

Only in a few exceptional cases has there been an absence of ascitic fluid, as mentioned by Hertz, Pollano and Barbour. In many cases, for example those of Abadie, Burckhard, Lange, Mirabeau, and many others, ascites is a very marked feature. Many speak of drawing off eight to ten liters of watery or bloody fluid. In some cases this enlargement forced the patient to seek relief, and has been mentioned as the cause of death (Kötschau). The fluid has varied from light, clear-colored fluid to hemorrhagic pus.

METASTASES AND EXTENSION

Metastatic growths have been found on the uterus, the opposite ovary, the peritoneum, omentum, liver, lungs, cord, and in my case they were found in the vagina, inguinal region, body, and legs. Metastases are very common. The uterus, bowel, and omentum have also been involved by direct extension.

OTHER COMPLICATIONS

Pneumonia complicated Papaïoannou's case. Pleuritic effusion, requiring repeated aspiration, has been noted. Graefe's case had thrombosis in leg previous to the operation. Lange reports embolism of the lungs once. A strange coincident lies in the fact that two of these cases, Marchand's second and Amann's fourth, developed the tumor in an inguinal hernia, while, as Andrews informs me, only 400 cases of ovarian hernia have been found. A possible ætiological factor might be traced to the irritation of the hernia. Ribbert's case required a portion of the bowel to be removed on account of the attachment of the tumor and degeneration of the bowel. Langer's case was complicated by a myoma of the uterus. Some cases died of peritonitis. In Mirabeau's case the tumor ruptured into the bowel. Haake and Schmaus speak of appearances of syncytial cells in their specimens. Hardly a case has been studied that some degenerative process has not been noted. Cystic, myxomatous, hyaline and calcareous degeneration and hemorrhagic infarct are common.

MORTALITY

A study of the 85 cases relative to mortality brings out these startling facts: 20 cases are reported to have died during the first month; 34 are reported recovered; 31 have no record as to recovery or death. If the term "recovery" referred to the ultimate outcome of the disease, this would make a fair showing but it does not. Eleven of the 34 "recovered" cases are reported as having had return and death, in from six weeks to five years. The term "recovery" refers only to recovery from the operation. In the remaining 22 cases reported "recovered," only a few are reported to have been seen afterward, the latest observation having been made in Hubert's case one and one half years after the operation.

Good results are reported after surgical treatment for endothelioma in other regions and no doubt evidence will be produced later of permanent recoveries after removal of ovarian endotheliomas but at present we lack this information, except that based upon observations made from a few weeks to one and one half years after operation. Randolph reports an example of spontaneous arrest of growth and disappearance of an endothelioma. Thus do we find, by direct statements, that 31 have died, while no observations have been made to prove permanent recovery in the remaining cases. Probably some of the early deaths were incident to the operation, but the death rate at this time was undoubtedly increased by the cachexia Borst, Zeit, and others call attention to the importance of early differentia ion, as the endothelioma is ess liable than other malignant tumors to return if operated upon early. Many of our cases were operated late, after metastases had occurred. When we remember the difficulty of differentiation clinically, and he tendency that some benign tumors have to undergo malignant degeneration, it emphasizes the necessity for early removal of all ovarian growths.

In conclusion, I would say:

1. Less confusion will prevail if the endothelioma is considered a separate class of tumor.

2. Such a classification has justification in the histogenesis, morphology, and arrangement of the cells.

3. The tumor cannot be made to conform to the sarcoma or the carcinoma.

4. Endothelioma should be divided into three varieties, as suggested by Amann, rather than two as suggested by Cullen and Eckardt, or five as suggested by Hansemann, to correspond with their three origins.

5. Endothelioma of the ovary has a high mortality if operation is delayed.

6 Patients should be educated to seek earlier relief for pelvic conditions.

7. On account of the tendency of the uterus to become involved and the growth to return in the opposite ovary, we should seriously consider the advisability of their removal at the time of removing a malignant tumor of the ovary.

8. The small number of cases of endothelioma of the ovary reported should stimulate us to a more careful consideration of our pathological material, in the interest of science and humanity.

BIBLIOGRAPHY

ABADIE, M. J. Tumeur solide bilatérale de l'ovaire. Annales de Gynecologie, vol. lviii, p. 62, 1902.

ACKERMANN, Th. Histogenese und Histologie der Sarkome. Volkmann's Sammlung klin. Vorträge, 1882.

Billroth-Lücke, Handbuch der Frauenkrankheiten, bd. ii, p. 340.

AMANN JR. Ueber Ovarialsarkome. Cent. f. Gyn. No. 42, 1893.

AMANN JR. Ueber Ovarialsarkome. Archiv f. Gynaek., vol. xlvl, p. 484, 1894.

AMANN JR. Demonstration eines soliden Ovarialtumors eines 14 jährigen Mädchens. Monatsschrift f. Geb. u. Gyn., vol. vi, p. 131, 1898.

APELT, F. Ueber die Endotheliome des Ovarium. Beiträge z. Geb. u. Gyn., bd. v, 3, p. 367, 1901.

BARBOUR, A. H. F. On Endothelioma of the Ovary. Obstetric Trans. Edinburg, p. 228, vol. xxx, 1905.

BELLATI. Sugli Endotheliomi dell' Ovaio. Il Poly. Clin., vol. ii, p. 164, 1895.

BÖHME, M. Sarcocarcinom d. pleura. Virch. Archiv bd. lxxxi, p. 181, 1880.

BERNSTEIN, H. A. Endothelioma of the Ovary. New York Med. Jour., Jan. 19th, p. 110, 1907.

BONNEY, W. F. VICTOR. Endothelioma Lymphaticum Ovarii. Archiv Middlesex Hospital, vol. iii, p. 178, 1904.

Jour. of Obst. & Gyn. British Empire, vol. xi, p. 245, 1904.

BORST, B. Lehre von den Geschwulsten, p. 276-292 1902.

Geschwulstwerke, bd. ii, p. 320.

BRAETZ, A. Endotheliom der Portio vaginalis. Archiv f. Gyn., vol. lii, p. 1, 1896.

BROUHA. Contribution à l'étude des endothéliomes de l'ovaire. Rev. de Gyn. et de Chir. Abdom., vol. iv, p. 435, 1900.

BRUCKNER, Jean. De L'Endothéliome de L'Ovaire. Revue de Gynécologie et de Chir. Abdominale, vol. v, p. 459, 1901.

BRUNS, C. Die Lymphgefässe der weiblichen Genitalorgane. Archiv f. Anat., 1898.

BUCKEL AND EXNER. Ueber die Lymphwege des Ovariums. Wien. bd. lxx, Abt. 3, 1874.

BUDGE. Quoted by Delamere in The Lymphatics, p. 78, 1904.

BURCKHARD. Ueber cystische Eierstocks-tumoren, endothelialer Natur. Zeits. f. Gyn. vol. xl, p. 253, 1899.

CARLESS, A. Reports concerning Endotheliomata and Peritheliomata. The Practitioner, vol. lxxvi, p. 228, 1906.

CORNIL AND RANVIER. Manuel d'Histologie Pathologique, vol. i, p. 228.

CULLEN. Angiosarcoma of the Ovary. Johns Hopkins Hospt. Bulletin vol. v, p. 134, 1894.

CUNÉO ET DELAMERE. Note sur l'histologie des lymphatiques de l'estomac. C. R. Soc. Biol., Mai, 1900.

DARTIGUES, L. Diagnostic et traitement des tumeurs solides de l'ovaire. Rev. de Gynécologie et de Chirurg. Abdominale, vol. iii, pp. 601, 793, 1013, 1899.

DEKHUYZEN, M. C. Ueber das Endothel nach Untersuchungen, welche mittelst modificirter Silbermethoden angestellt sind. Verhandlung. d. intern. mediz. Kongresses in Berlin, bd. ii, S. 4, 1891.

DELAMERE, G. General Anatomy of the Lymphatics, p. 78, 1904.

EBERTH, C. J. VON, und SPUDE. Familiäre Endotheliome. Virch Archiv, vol. 153, p. 60, 1898.

Ueber die Blut. und Lymphgefässe. Virch. Archiv, bd. xli., 1870.

ECKARDT. Ueber Endotheliale Eierstocktumoren. Zeits. f. Geb. u. Gynck., bd. xvi, p. 344, 1889.

EDEN, T. W. Ovarian Cyst. Trans. of the Obstet. Soc. of London, vol. xxxv, p. 408, 1893.

EWETZKY, TH. V. Fall von Endotheliom d. äussern Sehnervenscheibe. Archiv f. Augenheilk, vol. xii, p. 16, 1883.

FABRICIUS. Perforation eines malignen Ov. Tumors in die Tube. Wiener klin. Wochensch. vol. ix, No. 4–5, pp. 59–74, 1896.

FAGUET. Tumeur mixte de l'ovaire droit: kyste dermöide et endothéliome. Journ. de Medecine de Bordeaux, vol. xvi, p. 63. 1895.

FEDERLIN. Ein Fall von Endothelioma ovarii mit Metastasen in Lymph-drüsen und Uterus. Beit. z. Geb. u. Gyn., bd. viii, S. 190, 1904.

FLAISCHLEN. Zur Pathologie der Ovarien. Zeits. f. Geb. u. Gyn., bd. vii, p. 435, 1882.
FRAENKEL. Endotheliomen des Eierstokes. Monats. f. Geburts. u. Gyn., bd. vii, p. 252, 1898.
FRANQUÉ, Otto. Carcino-Sarko-Endothelioma tubae. Zeits. f. Geb. u. Gyn., vol. xlvii, p. 211, 1902.
GEBHARD, C. Pathol. Anatomie der weibl. Sexualorgane. Leipzig, 1899.
GERSTER. Ueber die Lymphgefasse des Hodens. Zeits. f. Anat. u. Entwickelungsgesch. Bd. ii, 1877.
GLOCKNER, A. Ueber secundäres Ovarialcarcinom. Archiv f. Gyn., vol. lxxii, p. 410, 1904.
Beiträge zur Kentniss der soliden Ovarialtumoren. Archiv f. Gyn., bd. lxxv, p. 49, 1905.
GODART. Endotheliome des deux Ovaries. Ann. de Gyn. July-Oct., 1902.
GOLGI. Sulla struttura e sullo svilappo degli Psammomi. Pavia 1869. Reference Virch. Archiv bd. 51, p. 311, 1870.
GOTTHEIL, W. S. Endothelioma of the Skin. Journal of Am. Med. Ass., p. 93, Jan. 12, 1907.
GRAEFE, M. Ein Fall von Endothelioma der Portio vaginalis. Archiv f. Gyn., bd. lxxii, S. 373, 1904.
GRAEFE, M. Zwei Fälle von Endo-bezw. Perithelioma ovarii und ein Fall von Endothelioma der Portio vaginalis. Der Frauenarzt, vol. 20, p. 262, 1905.
GUFFROY. Cited by Apelt. Beitrage zu Geb. u. Gyn. vol. v, p. 377, 1901.
HAAKE. Ueber Geschwulstbildungen endothelialen Ursprungs in einem Ovarialkyston. Diss. Halle, 1901.
Ueber Endotheliome. Deutsche Med. Wochenschr., vol. 22, p. 52, 1896.
HANSEMANN, D. Ueber die sogenaunten Zwischenzellen des Hodens, etc. Virch. Archiv, vol. cxlii, p. 358, 1895.
HAMBURGER. Quoted by Delamere in The Lymphatics, p. 69, 1904.
HEIDENHAIN, R. Versuche und Fragen zur Lehre von der Lymphbildung. Archiv f. die Gesammte Physiologie, vol. xlix, p. 209, 1891.
HEINRICIUS. Ein Fall von Endothelioma lymphaticum ovarii. Archiv f. Gyn., bd. lxxiii, Heft. ii, S. 326, 1904.
HEISLER. Text Book of Embryology, p. 55, 1901.
HENROTIN AND HERZOG. Myoma ovarii; Endothelioma ovarii; Calcified Corpus Luteum. Am. Jour. of Obstetrics, vol. 40, p. 781, 1899.
HERFF, VON. Verhandl. der D. Ges. f. Gynäkol., zu Wien, p. 480, 1895.
HERTWIG, O. Urmund und Spina bïfida. Archiv f. mikr. Anat., vol. 39, p. 353, 1892.
HERZ, MAX. Zur Kenntniss des Endothelioms, im Anschluss an ein Endothelioma lymphaticum ovarii. Monats. f. Geb. u. Gyn., bd. ix, 4 p. 458, 1899.
HILDEBRAND. Ueber das tubuläre Angiosarkom oder Endotheliom des Knochens. Deutsche Zeits. f. Chir., bd. xxxi, p. 263, 1891.
HIPPEL. Zur Casuistik der Angiosarkome. Archiv f. Gyn., bd. xiv, 1893.
HIS. Beobachtungen ueber den Bau des Säugetier stocks. Archiv f. mikro. Anat., bd. i, p. 151, 1865.
Lecithoblast und Angioblast der Wirbeltiere. Abhandlung. d. mathem. physik. Klasse. der königl. sachs. Gesellschaft. der Wissenschaften, bd. xxvi, No. 4, 1900.
HUBERT, R. Ueber Ovarialgeschwülste bei Kindern. Inaug., Diss. Giessen, 1900.
JONES, MARY A. D. Disease of the Ovary. New York Med. Jour., vol. L, p. 337, 1889.
JONNESCO. Perithéliome Primitive des Ovaries avec Metastase dans l'Epiploon; Bull. et Mem. Soc. Chir. Bucharest, p. 115, 1902.
KADYGROBOW, B. Die Endotheliome des Eierstocks. impathologisch-anatomischer und klinischer Beziegung. Quoted in Revue der St. Petersburger Med. Woch. Revue. der Russ. Med. Zeit., p. 5,1905.
KIRCHGESSNER, PH. Ueber Endotheliome cervicis uteri, Zeits. f. Geb. u. Gyn., vol. xlix, p. 197, 1903.
KITT. Text Book of Comparative General Pathology, p. 380, 1906.
KLAATSCH, H. Ueber den jetzigen Stand der Keimblattfrage mit Rüchsicht auf die Pathologie. Münch. Med. Wochen, vol. 46, p. 169, 1899.
KOLACZEK, J. Ueber Angiosarkoma. Deutsche Zeits. f. Chir., bd. ix, 1878.
Ueber das Angio-Sarkom. Deuts. Zeits. f. Chirg., vol. ix, p. 1. 207, 1877. Also vol. xiii, p. 1, 1880.
KÖTSCHAU. Ueber die Endothelioma ov. Central. f. Gyn., bd. xx, 1896.
KÖSTER. Kankroid mit hyaliner Degeneration, Virchows Arch. vol xl. 1867.
KROMPECHER, E. Ueber Geschwülste insbes. d. Endotheliome des Hodens. Virch. Archiv. bd, cxi, 1898.
Der Basalzellenkrebs. Dissert. Jena, 1903.
Ueber Epitthel, Endothel. Zieglers Beiträge z. Patholog. Anatomie, vol. xxxvii, p. 28, 1904-5.
KRUKENBERG, F. Ueber Fibrosarkome ov. Archiv f. Gyn., bd. l, 1896.
Beiträge zur Kenntniss des Perithelioma ovarii. Zeits. f. Geb. xli, 1899.
Zeits. f. Geb. u. Gyn., bd. v, 11.3, p. 383, 1901.
LANGE, M. Ein Fall von Endothelioma Ovarii. Centralb. f. Gyn., vol. xxvii, p. 65, 1903.
LANGER, A. Ueber einen Fall von Sarcoma Ovarii. Archiv f. Gyn., bd. xlix, p. 508, 1895.
Beiträge z. Geburt. u. Gyn., vol. v, p. 379, 1901.
LEOPOLD, GERHARD. Die soliden Eierstocksgeschwülste. Archiv. f. Gyn., vol. vi, pp. 3 and 202, 1873-74.
LEOPOLD, V. Ueber die Häufigheit der malignen Ovarialtumoren und ihre operative Behandlung. Deutsche med. Wochenschr. No. 4, vol. 18, p. 61, 1887.
Ueber maligne Ovarialtumoren bei Kindern. Centralbl. f. Gynäkol., vol. xviii, p. 1171, 1894.
LIMNELL, AXEL R. Zur Anatomie der Ovarientumoren. Arch. f. Gyn. Vol. lxiii, p. 547. 1901.
LINCK. Ein Fall von Endothelioma lymphaticum kystomatosum beider Ovarien. Diss Königsberg, 1900.

LINCOLN. Endothelioma of the Ovary. Cleveland Med. Jour., p. 29, 1903.

MALASSEZ, L. Sur le Cylindrome (Epitheliome Alveolaire avec envahissement myxomateux). Archiv de. Physiol., vol. i, p. 123, 1883.

MALLET, G. H. A Case of Round-celled Sarcoma of the Ovary. Med. Record, vol. xlv, p. 237, Feb. 24, 1894.

MARCHAND. Beiträge zur Kenntniss der Ovarialtumoren Abhandlg. d. Naturforschergesellschaft. Halle 1879, bd. xiv, Heft. 3, 1879.

MARTIN, A. Diseases of Women, p. 492, 1890.

MINOT. Laboratory Text Book of Embryology, p. 35, 1903.

MIRABEAU. Perithelioma ov. cysticum. Monatssch. f. Geb. u. Gyn., bd. x, 1894.

MIT, RIBBERT. Festschrift der Naturforcher Gesellschaft in Zürich, 1746, 1896.

MOST. Ueber die Lymphgefässe und Drüsen des Hodens. Archiv f. Anatomie, 1899.

MÜLLER, P. Zur Kenntniss und Behandlung der Ovarialcarcinome. Correspondence-Blatt f. Schweizer Arrzte No. 5, p. 147, 1889.

MÜLLER. Ueber Carcinom u. Endotheliom des Eierstockes. Archiv f. Gyn., bd. xlii, p. 387, 1892.

NEELSEN, F. Endothelekrebs. Deutsch. Archiv f. klin. Med., bd. xxxi, p. 375, 1882.

NEUMANN. Dermoidcyste eines überzahligen Eierstocks mit maligner (perithelialer) Degeneration der Cystenwand. Archiv f. Gyn., bd. lviii, 1899.

NICHALOVICS. Beiträge z. Anatomie und Histologie d. Hodens. Arbeiten aus d. physiol. Anstalt. zu Leipzig, 1873.

OLSHAUSEN, R. Billroth's Handbuch der Frauenkrankheiten, vol. ii, p. 340, 1886.

Diseases of the Ovary. Cyclopedia of Obstetrics and Gynecology, vol. viii, p. 64, 1887.

ORTH, J. Weibliche Geschlechtsorgane. Lehrbuch d. spec. pathol. Anatomie, vol. ii, p. 573, 1893.

PALTAUF. Geschwülste des gland carotida. Zeigler's Beiträge, bd. ii, 1892.

PAPAÏOANNOU, T. L. Zur Kenntniss der endothelialen und metastatischen Ovarialtumoren. Monatschrift f. Gebtshülfe u. Gyn., vol. xx, p. 802, 1904.

PFANNENSTIEL, J. Ueber die papillären Geschwülste des Eierstocks. Archiv f. Gynäkol., bd. xlviii, p. 507, 1894-95.

PICK, L. Die von den Endothel ausgehenden Geschwülste des Eierstocks. Berlin klin. Woch, 1874.

Zur Symtomatologie und Prognose der Sarkome des Eierstocks. Centr. f. Gyn., bd. xviii, p. 940, 1894.

Die von den Endothelien ausgehenden Geschwülste des Eierstocks. Berlin klin. Woch. No. 45-46, 1894, bd. xxxi, p. 1017-1046.

Zur Histogenese und Classification der Gebärmutter sarcome. Archiv f. Gyn., bd. xlviii, Heft. 1, p. 24, 1894-95.

Zur Lehre von Myoma sarcomatosum und über die sogenannten Endotheliome der Gebärmutter. Archiv f. Gync., bd. xlix, p. 20-21, 1895.

POLANO, O. Ueber Pseudoendotheliome des Eierstocks. Zeits. f. Geburtshülfe. u. Gyn., vol. li, p. 1, 1904.

POLLAK, E. Zur Kenntniss des Perithelioma ov. Monats. f. Geb. u. Gyn., bd. vii, p. 179, 1898.

POMORSKI, J. Endothelioma Ovarii. Zeits. f. Geb. u. Gyn., bd. xviii, p. 92, 1890.

PRENANT. Sur la valeur morphologique sur l'action physiologique et therapeutique possible du corps jaune. Rev. med. de est., vol. cccxxxiii, p. 385-389, 1899.

RANDOLPH, B. M. Spontaneous arrest of Growth in an Endothelioma. Proceedings of Patholog. Soc. of Phil., April, 1904.

RANVIER. Circulation de la lymphe. C. R. Acad. Sciences, vol. cxix, 1894.

Chyliferes du rat. C. R. Acad. Sciences, p. 621, 1894.

Morphologie du systeme lymphatique. De l'origine des lymphatiques dans la peau de la grenonille. C. R. Acad. Sciences, vol. cxx, p. 132, 1895.

Development des vaisseaux lymphatiques. C. R. Acad. Sciences, 30 des., p. 1105, 1895.

Etude Morphologique des capillaires lymphatiques des mammiferes. C. R. Acad. Sciences, vol. cxxl, p. 856, 1895.

Sur une substance colloïde, myélinoïde elaborée par les lymphatiques a l'etat normal. C. R. Acad. of Sciences, vol. cxxii, p. 428, 1896.

Morphologie et dévelopment du systéme lymphatique Archiv d'anatomie microscopique, vol. i, p. 137.

RECKLINGHAUSEN, F. I. von. Canstatt's Jahresbericht u. die Fortschritte der gesammten Medicin., 1862.

Uber die Lymphgefasse u. ihre Beziehung zum Bindegewebe. Berlin, 1862.

Gräfe's Archiv für Ophthalmologie, bd. x, h. 2, p. 71, 1864.

RENANT, J. Sur la forme et les rapports réciproques des eléments cellulaires du tissu conjunctif lâche. Compt. rend. lxxxiii, No. 23-24. 1875, 1876.

RHEINSTAEDTER. Kindskopfgrosses Angiosarkoma ovarii in einem Leistenbruch. Mangel des Uterus bei abnorm weiter Scheide. Centralb. f. Gyn. No. 23, vol. ii, p. 545, 1878.

RIBBERT, H. Ueber das Endothel in der Pathologischen Histologie. Jahrschrift d. Naturforsch-Gesellsch. in Zürich, bd. 2, 1896.

Zur Geschwulstfrage. Münch. med. Wochen. No. 25, vol. xlv, p. 774, 1898.

RIEDER. Ein Fall von primärem Ovarialsarkom. Münch med. Wochenschr, vol. xxxvi, p. 5, 1889.

RINDFLEISCH. Lehrbuch der Pathologischen Gewebelehre, 1873.

ROBIN, CH. Sur l'epithelioma des séreuses. Jour. de. l'anatomie et de la physiologie, vol. vi, p. 239, 1869.

ROLLESTON, H. D. AND GRÜNBAUM, O. F. F. Microscopic Sections from Four Tumors. The Lancet, vol. i, p. 1249, 1902.

ROSINSKI, B. Zur Lehre von den endothelialen Ovarialgeschwülsten. Zeits. f. Geb. u. Gyn., bd. xxxv, p. 214, 1896.

ROSSIER, G. Anatomische Untersuchung der Ovarien in Fällen von Osteomalacie. Archiv f. Gyn., p. 606, bd. xlviii, 1894-95.
ROSTROM, E. von. Endothel-carcinom. Inaugur. Dissert. Erlangen Marz, 1876.
ROSTHORN, ALFONS v. Zur Kenntniss des Endothelioma ovarii. Archiv f. Gync., bd. xli, p. 328, 1891.
SATTLER. Ueber die sogen Cylindrome u. ihre Stellung im onkolog System, 1874.
SALA, L. Sullo sviluppo dei cuori linfatici e dei dotti toracici nell' embrione di pollo. Univ. di. Roma, vol. vii, p. 263, 1900.
SCHMAUS, HANS. Ueber einen Ovarialtumor mit chorionepitheliomartigen Metastasen im Peritoneum. Beiträge z, Geb. u. Gync., bd. x, p, 217, 1905-1906.
SCHMIDLECHNER, C. "Perithelioma labii majoris," Arch. f. Gyn., vol. lxxiv, Heft. l, p. 195, 1904.
SCHULZ, R. Das Endothelcarcinom. Archiv f. der Heilkunde, p. 1, 1876.
SCHÜRMANN. Ein Fall von Endothelioma ovarii lymphaticum cysticum. Zeit. f. Geb. u. Gyn. bd. L, p. 233, 1903.
SCHWERTASSEK, FRANZ. Sarcomatose Degeneration einer mit einem Teratom. combinirten Ovariencyste. Archiv f. Gyn., bd. xlvii, p. 568, 1894.
SEEGER. Ueber solide Tumoren des Ovarium. Inaug. Dissertat München. 1888.
SILBERBERG, O. "Ein Fall von Endothelioma uteri," Arch. f. Gyn., vol. lxvii, p. 469, 1902.
SOUBEYRAN, P. Endotheliome de l'Ovaire. Bell et Mem. de la Soc. anat. de Paris, Juillett. No. 7, p. 435, 1902.
STAUDER. Ueber Sarcome des Ovariums. Zeits. f. Geb. u. Gyn., bd. xlvii, S. 387, 1902.
SJÖBRING-LUND, NILS. Ueber die Ætiologie der Geschwülste. Verhandlg. d. Deutschen Patholog. Gessellsch., vol. iii, p. 65, 1900.
TEMESVÄRY. Pathologie der Ovarialsarkome. Verhandl. der D. Ges. f. Gyn., vol. vi, p. 746, 1895.
THEILHABER. Beiderseitiges Ovarialsarkom. Münch. Med. Woch. No. 28, vol. 40, p. 534, 1893.
TROVATI. Contributo allo Studio dell Endothelioma dell Ovaio. Ann. di Ost. p. 201, 1898.
VAN BENEDEN, E. Recherches sur les premiers stades du développement du Murin. (Vespertilio murinus). Anat. Anzeiger., vol. xvi, p. 305, 1899.
VELITS, D. v. Endothelioma cysticum myxomatodes ovarii. Zeits. f. Gync., vol. xviii, p. 106, 1890.
VOIGT, M. Zur Kenntniss des Endothelioma ovarii. Archiv f. Gynäk., bd. xlvii, 3 p. 560, 1894.
VOLKMANN, R. Ueber endotheliale Geschwülste, Zeits. f. Chirg., bd. xli, 1895.
WIEDERSHEIM. Endothelioma of the Ovary. (Jahrsbericht. Geb u. Gyn., vol. xv, p. 256, 1901.)
ZANGEMEISTER, W. Ueber Sarkome des Ovariums. Beiträge z. klin. Chirurgie, vol. xvi, 11 p. 397, 1896.
ZEIT, F. R. Morphologic and Histogenetic Characteristics of Endothelial Tumors. Jour. of the American Med. Assoc. vol. xlvi, p. 567, 1906.

SURGERY OF THE LIVER

A SERIES OF LIVER CASES IN WHICH IT WAS NECESSARY TO REMOVE A SEGMENT OF THE LIVER OR TO SUTURE TORN AREAS

BY THOMAS S. CULLEN, M. D., BALTIMORE, MARYLAND

IN the *Journal of the American Medical Association*, April 22, 1905, in a brief review of the literature on the surgery of the liver, I emphasized the fact that, although Brunn, in 1870, had removed a small hepatic tumor, the surgery of this organ had attracted little attention until 1886, when Lin sucessfully performed a partial resection. Between 1886 and the date of my paper, over one hundred resections of portions of the liver had been re ported.[1]

In this review, reference was made to the excellent work of Keen, Tiffany, and others in America, of Terrier and Auvray in France, and of Langenbuch in Germany, as well as to the various animal experiments that had been performed. The various methods of suturing the liver were illustrated, and the great value of Kousnietzoff's liver-needles was pointed out. Since the publication of my paper, in two cases in which I found it necessary to remove wedges of the liver substance, I approximated the raw surfaces by means of blunt needles; and in two other cases, where the liver had been lacerated, I readily brought the friable surfaces together and completely checked the bleeding by the use of the blunt needles. In all of the five cases the outcome, as far as the operative technique was concerned, was eminently satisfactory.

[1] Mayo Robson, in his third edition of *Gall-bladder and Bile-ducts*, reports a most interestng series of cases where he performed partial hepatectomy.

REMOVAL OF A PORTION OF THE LIVER

CASE 1. Removal of a large secondary carcinoma of the liver.

CASE 2. Hysterectomy for a large myoma. Excision of the gall-bladder and removal of a wedge of liver substance, where carcinoma of the gall-bladder could not be excluded.

CASE 3. Excision of the gall-bladder and a wedge of liver substance, where there was great thickening of the wall of the gall-bladder and a suspicion of malignancy.

A reference to the first case will show that a secondary carcinomatous nodule, 16x14x13 cm., was cut away from the lower portion of the liver and that the raw surfaces were approximated with little difficulty. It will also be noted that very little blood was lost during the operation, and that although the patient had only one kidney, she promptly recovered, despite the fact that at the time of operation the urine from this remaining kidney contained blood and pus. It would be difficult to find a case offering less chance for a successful liver resection. It is now over two and a half years since this liver tumor was removed, and although there is a definite local return where the left kidney was taken away, the liver appears to be free from any new growth.

In our second case, operated upon in the Hamilton General Hospital, after removing a myomatous uterus which extended far above the umbilicus, we found the enlarged gall-bladder filled with stones, and in its upper portion a densely thickened area, strongly suggestive of carcinoma. In this case, after liberating and clamping the cystic duct, I removed the gall-bladder, and with it a wedge of liver substance. The bleeding was not excessive, and not having liver-needles, I used a bodkin, which can be readily obtained in any hospital or home. This case afforded, also, a rather severe test of liver surgery. The patient was a stout woman. She had been suffering for years from transitory glycosuria, and her urine contained some albumin and casts. Moreover, a tedious hysterectomy was performed before the liver complications could be dealt with.

In case 3 the patient was thin, and there were no other complications. The omentum was densely adherent to the gall-bladder, and the walls of this viscus were much thickened. We strongly suspected carcinoma, and even after the gall-bladder had been removed, it was impossible to exclude carcinoma entirely.

INDICATIONS FOR RESECTION OF A PORTION OF THE LIVER

It is important to determine: 1. Whether the growth be malignant or not; and 2. If malignant, whether it is primary or secondary. In the case of metastatic neoplasms, as a rule, operation is contra-indicated, inasmuch as they are usually multiple. Primary carcinoma or sarcoma of the liver is rare. Should the hepatic growth be primary, the glands along the vessels and at the base of the liver should be carefully palpated, to ascertain whether they have become involved. This point was first insisted upon by Tuffier. In cases of lymphadenoma with secondary nodules in the liver, operation is not advisable. In all cases of liver growths the following points should be carefully considered: (*a*) Whether the growths be single or multiple; (*b*) The situation; (*c*) The size; (*d*) Whether they are pedunculated or not.

If the growths are multiple and scattered over a wide area, removal is difficult or impossible. On the other hand, provided that they are near the lower edge of the organ, resection is feasible. In fact, in the majority of cases, the situation is all-important.

The size is of little importance when the growth is pedunculated and situated near the lower margin of the liver. In the case of a large tumor, however, located near the middle of the organ, removal is exceedingly difficult or impossible. If it is located near the edge, amputation is not difficult; but if it is near the middle of the lobe, a very large portion of the liver must be resected; otherwise a cavity is left, which may be the source of an alarming or even of an uncontrollable hemorrhage. When the growth lies near the portal vein or hepatic arteries, operation is contra-indicated, since large branches of these vessels are liable to be injured, with a resulting necrosis of correspondingly large areas of liver substance and the death of the patient. If the growth be pedunculated, its removal is easier, inasmuch as the liver substance forming the pedicle is much tougher than other portions of the organ. This toughening is due to partial atrophy of liver-cells.

Fig. 1. Secondary carcinoma of the liver. The liver is markedly displaced downward. Occupying the greater part of the right upper quadrant of the abdomen is a hepatic tumor. Downward, this reaches almost to the anterior superior spine; medianward, it passes nearly to the umbilicus; and laterally, it makes the abdominal wall prominent. The growth seems tense, is slightly lobulated, and, although sharply outlined, gradually blends with the liver substance. The edge of the liver forms a prominent ridge along the lower margin of the growth, and the gall-bladder is seen lying against the under and inner surface of the tumor. It is readily seen that when the cystic duct was severed the greater part of the liver could be rolled out of the abdomen. For a cross-section of the hepatic growth, see Fig. 2.

REPORT OF CASES IN WHICH PORTIONS OF THE LIVER WERE REMOVED

A large cacinomatous tumor of the liver; removal seventeen months after nephrectomy for carcinoma of the left kidney (Figs. 1, 2, 3); temporary recovery.[1]

I saw this patient in consultation with Dr. E. R. Trippe, of Easton, Maryland, on June 6, 1903. She was 30 years of age and of very slight build. For six months she had felt a small lump in the left side, but had hesitated to speak of it until a week previously. The lump was very noticeable in the region of the left kidney, and at first had increased in size onl ygradually, but later at a much more rapid rate. The patient was operated upon on January 8, 1903, and we found a very large carcinomatous kidney measuring 20x13x12 cm. The capsule of this was very delicate, and ruptured during the removal of the tumor, so that I did not think that the entire growth had been removed.

Histological examination of this kidney showed the growth to be a typical adenocarcinoma. The patient made a satisfactory recovery, and left the hospital after the fifth week.

On March 9, 1903, I received a letter from her, saying that she was very much improved; the wound had healed entirely, and she was feeling much stronger.

Subsequent History. On June 2, 1904, I received a message from Dr. Trippe, saying that the patient was not so well and her temperature was 102.5°. Five days previous to this, the patient had noticed a small lump just below the free edge of the ribs, on the right side. At first it gave her no concern, but apparently doubled in size within a few days.

Examination. When I saw her, the tumor occupied the region between the edge of the ribs and the anterior superior spine. It was round, tense, and somewhat movable. We were very careful in our examination, fearing that it might be a friable secondary growth following the removal of the large carcinomatous kidney in

Fig. 2. Secondary carcinoma of the liver. As the specimen was very soft, it was impossible to cut it before hardening. Encircling the entire growth is a definite capsule, varying from 1 to 3 mm. in thickness. *a* is the sharp edge of liver substance that passed over the lower surface of the growth. This growth bears much resemblance to the parent kidney tumor, and in its central portion has undergone complete necrosis. The cut surface of the liver indicates the line of amputation. This growth measured 16x14x13 cm.

[1] Abstracted from *Jour. Amer. Med. Assoc.*, April 22, 1905.

January, 1903. Her pulse was rapid; the temperature was 102.5° F.

Operation. As she was losing ground rapidly, an immediate operation was decided upon. An incision having been made over the tumor, it was found to be perfectly smooth and free from adhesions. The incision was continued upward to the free margin of the ribs and downward almost to the anterior superior spine. The growth had originated in the liver. It was larger than a child's head and almost globular in form. The edge of the liver appeared as a slightly elevated ridge, forming a crescent over the center of the anterior surface of the growth. (Fig. 1.) Attached to the inner side of the growth was the gall-bladder. I carefully examined the liver, but failed to find any secondary growths, and also was unable to detect any evidence of metastases in the abdominal organs or any thickening in the renal region on the left side. The right kidney was about half as large again as usual, but was perfectly normal, considering the absence of the other. The urine, however, contained some pus and a little blood. On careful examination it was impossible to determine whether we were dealing with a cystic new growth or an abscess formation. (Fig. 2.) After some hesitation, we decided to remove the growth, together with a small part of healthy liver substance. The gall-bladder was exposed, the cystic duct clamped and cut, and the proximal portion of the duct tied off. The lower half of the liver was then readily drawn out through the abdominal incision. It was everywhere walled off from the abdominal contents by gauze, and a gauze rope was securely fastened around the liver about an inch above the point at which the cut was to be made. A cautery was called for, but, fortunately, as after-results showed, the instrument would not work. I then took a long blunt needle and started from left to right, passing mattress sutures through the entire substance of the liver. These were about 1 cm. apart, and each overlapped the other for about 2 or 3 mm. The greater number of sutures consisted of Pagenstecher thread, the supplementary ones being of catgut. After placing two or three mattress sutures, I commenced to cut, the tumor at the same time being held taut. The sutures were then tied. This process of applying sutures and cutting and then tying was continued until the entire growth had been removed. Five or six large blood-vessels were encountered, which

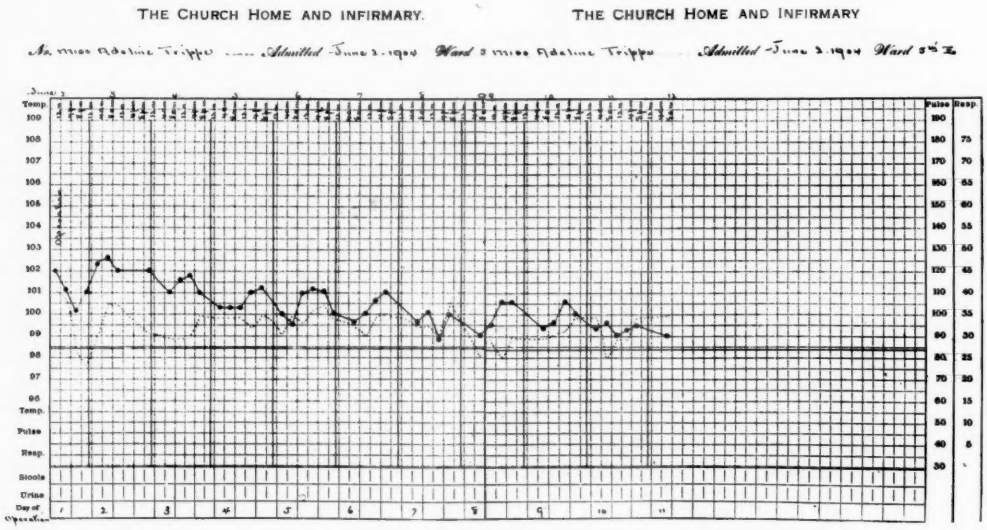


Fig. 3. At the time of operation the temperature was 102°. It gradually dropped from the time of operation, reaching normal on the eleventh day. The pulse-curve follows the temperature-curve closely.

Fig. 4. A large gall-bladder removed in its entirety. In the upper part of the figure is represented a cross-section of the cystic duct and of the surrounding tissues. The gall-bladder is greatly enlarged, uniformly distended, and resembles a sausage. The raw area seen in front corresponds to the attachment of the gall-bladder. At the top of the gall-bladder, and firmly attached to it, is a wedge of liver, and attached to the surface of this are several adhesions. For the appearance of the gall-bladder on section, see Fig. 6.

spurted freely. They were picked up with artery-forceps and tied freehand with fine Pagenstecher thread. The entire growth was removed without the loss of more than two drams of blood. After the sutures had been tied, there was absolutely no bleeding from the surface. After removal of the growth there remained a raw surface fully 16 cm. in length and 6 cm. in breadth. On making traction on the sutures I found that the raw surface could be rolled in upon itself, so that the two halves formed flaps. These were brought together until little or no raw substance remained. The ends of the sutures that had already been tied were utilized to bring the opposite sides together. Iodoform-gauze was placed beneath the edge of the liver and also on its surface. Although the patient was apparently in a desperate condition when she went upon the table, she stood the operation well, and when she was taken from the operating-room her pulse was only 104, and on the next day her temperature dropped to 100° F., the general condition was excellent, and the pulse 84. To look at her, one would hardly realize that any operation had been performed. She made a rapid recovery, and left the hospital in about four and a half weeks.

November 26, 1906. About August 4, 1904, suspicious areas of thickening were noted along the renal scar on the left side. In February, 1905, Dr. Trippe informed me that from time to time some sutures had come away through a small sinus, and that later the wound had healed entirely. At the present time there is marked local return of the cancerous growth where the kidney was situated, but there is not the slightest evidence of any return of the growth in the liver. There is no doubt whatever that the patient will soon succumb to the original renal growth, but it is now* four years since the kidney was removed, and the patient, up to a few weeks ago, had been able to go around everywhere.

Hysteromyomectomy; excision of a large gall-bladder containing a thickened area suggestive of malignancy; resection of a wedge of liver substance with the gall-bladder (Figs. 4, 5 and 6); approximation of the cut surface of the liver by mattress sutures of catgut; recovery.

Mrs. R., aged 47, seen in consultation with Dr. E. B. O'Reilly of Hamilton, Ontario, on August 20, 1906. This patient for a number of years has had sugar in the urine at frequent intervals, and has also had some albumin. Eight years ago she noticed a small lump in the uterus. This has greatly increased in size, and has been associated with much uterine bleeding. At present the tumor is larger than an adult's head, and extends above the umbilicus. The patient is a very stout, well-nourished woman, weighing nearly two hundred pounds.

* January 15, 1907.

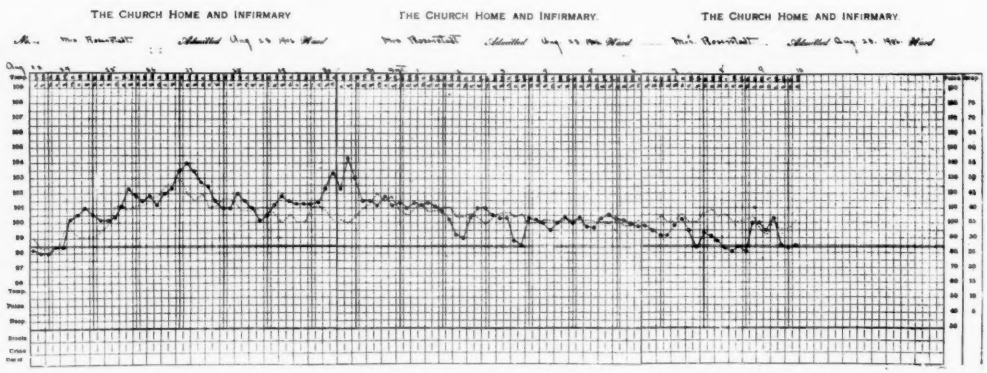


Fig. 5. At the time of operation the temperature and pulse were normal. The temperature on the evening of the day after operation rose to 101°. The next day it rose to 102.4°, and on the fourth day reached 104°, came down considerably, but did not reach normal. On the seventh day it ran up to 104.4°. From that time it slowly dropped to normal. It will be noted that the pulse-curve was similar to that of the temperature.

Operation. On August 24, 1906, I operated in the Hamilton General Hospital, assisted by Drs. O'Reilly, Griffin, and Wallace. After removal of the large myomatous uterus, it was noticed that the gall-bladder was enlarged and prominent, and that it was filled with stones, and furthermore, that, projecting from the top of the gall-bladder, there was a glistening area, which appeared to be a new growth and to extend some distance into the liver substance. Fortunately, the liver was much farther down than usual, and we were able to bring it fairly well out of the abdomen. We removed the gall-bladder and also a wedge of the liver. (Fig. 4.) We had no liver-needles with us, nor did we have Hagedorn needles, which might have been introduced eye first. We accordingly used a bodkin, and mattress sutures of catgut were then introduced, which completely approximated the raw surfaces and checked all oozing. The patient stood the operation well.

October 5, 1906. I am just in receipt of the following communication from Dr. O'Reilly, who had charge of the patient: "She is up daily, and the wound is almost closed. There is no sugar; no albumin."

November 12, 1906. I have just received the following communication from Dr. E. B. O'Reilly: "Patient leaving hospital to-morrow. Looks 15 years younger. No sugar; no albumin."

Description of the Gall-bladder. Gyn.-path. No. 10419. This specimen consists of a large gall-bladder and a wedge of liver. (Figs. 4, 6.)

The gall-bladder is sausage-shaped, 11 cm. long and averaging 4 cm. in diameter. Attached to its upper surface are a few delicate adhesions. Where it comes in contact with the liver is a dense area 3 cm. in diameter. This, at operation, strongly suggested malignancy, and had encroached markedly on the liver substance. The wedge of liver removed is 4 cm. in breadth and 5 cm. in length, and varies from 1.5 cm. to 3.5 cm. in thickness. A small portion of the cystic duct is attached to the specimen, and averages 5 mm. in diameter.

On section, the gall-bladder walls are found to average 2 mm. in thickness. Near the cystic duct, however, there is a sacculation 1 cm. in length, 2.5 cm. in breadth. (Fig. 6.) Here the walls vary from 0.3 cm. to 1.5 cm. in thickness. The inner surface of the gall-bladder is slightly corrugated and has delicate trabeculæ. Near the cystic duct there is some pus. Almost completely filling the gall-bladder are two stones, one barrel-shaped and with a little excrescence on one side. This stone is 2.5 cm. in length, 2 cm. in breadth, and has facets on either end. Beside this is a large, irregular stone about 3 cm. in diameter. The gall-bladder also contains several smaller stones.

The thickened portion of the gall-bladder, that was attached to the liver, is 3 cm. in length and 4 cm. in breadth. It presents a pearly white appearance, and has irregular yellow mottled areas scattered throughout it. Even on section it is impossible to tell whether this is malignant or not. The relation between the thickened area and the liver is most intimate, and it would be impossible to separate the gall-bladder from the liver by blunt dissection without injury to the liver.

Miscroscopic Description. Sections from the inner wall of the gall-bladder in many places show a typical granulation tissue, consisting of new connective-tissue cells, capillaries, and of polymorphonuclear leucocytes. In the vicinity of such areas no epithelial lining is present, but at protected points the epithelium is cuboidal or high cylindrical. Even at such points, however, the underlying stroma shows marked small round-celled infiltration.

The great thickening noted in the upper end of the

Fig. 6. Longitudinal section of the gall-bladder. For the outer appearance, see Fig. 4. The cystic duct is slightly thickened. The walls of the gall-bladder are increased in thickness, and at point *a* reach a thickness of fully 1.5 cm. It is here that the picture is so suggestive of a commencing malignant growth, that without microscopic examination it was impossible for us to say whether we were dealing with an inflammatory thickening or with a commencing cancer. Attached to the surface is a wedge of liver substance. The interior of the gall-bladder is much distended by two large and several smaller stones. There is a tendency toward partial partitioning off of the gall-bladder into smaller areas, as seen at *b*.

gall-bladder is due, in part, to massive infiltration by small round cells, but also in a large measure to the replacement of adipose tissue by connective tissue. The connective tissue of the gall-bladder merges imperceptibly with that of the liver capsule, and in the liver we have quantities of small round cells surrounding the lesser bile-ducts. Whether the gall-stones antedated the inflammation it is impossible, of course, to determine.

Diagnosis. Chronic purulent cholecystitis, with extension to the inflammatory process to the liver.

Fig. 7 Complete removal of the gall-bladder, together with a wedge of the liver. The cystic duct is thickened. The gall-bladder is somewhat enlarged. Attached to it is a wedge of liver tissue, and at the upper portion we have a broad band of omental adhesions. For the appearance of the gall-bladder on section, see Fig. 9.

Obscure thickening of the gall-bladder, with dense adhesions to the liver and omentum; cholecystectomy, with removal of a wedge of liver 5 × 5 cm. (Figs. 7, 8 and 9); approximation of raw liver surfaces by mattress sutures of catgut; recovery.

F. G., aged 32, married, white; referred to me by Dr. Stump of Philippi, West Virginia. She was admitted to the Church Home, October 12, 1906. She complained of sudden, cramp-like pains in the epigastrium. Apart from the fact that one brother had died of "scrofula" about eighteen years before, her family history was good. Her menstrual history had been of no importance. She had been married fourteen years, and had had six children. Five weeks previously, she had complained of sudden, cramp-like pains in the epigastrium. These occurred intermittently for the first twenty-four hours, and the pain became so severe

that she had to go to bed. She was nauseated, took several emetics, but vomiting gave only temporary relief. She remained in bed for two weeks. On the morning after the attack commenced, the patient noticed a swelling beneath the right costal margin. This caused much discomfort. By the end of the first week the pain had ceased completely, but since the first attack there had been occasional sharp pains. On admission the tumor was smaller than when first observed.

Examination. The tumor is situated in the right upper abdominal quadrant. It can be moved around to some extent. It feels in contour very much like a prolapsed right kidney. It is firm on palpation. The patient gives an indefinite history of jaundice five weeks ago, otherwise we should have felt relatively certain that we were dealing with a kidney. The patient has not been able to work since her attack five weeks ago. She thinks she has lost in weight.

October 14, 1906. A careful cystoscopic examination showed perfectly normal urine and a normal bladder mucosa. On examination the blood showed a leucocytosis of 14,000, although the temperature and pulse on her admission were normal.

Operation. October 15, 1906. On opening through the right rectus, we encountered a thickened and adherent omentum. This was fast to the gall-bladder, and the stomach and transverse colon were also firmly adherent to it. The gall-bladder seemed to be exceedingly firm, and was encroaching upon the liver to some extent. It was necessary to free the gall-bladder from the liver, but the connection between the two was so intimate that we decided to take a wedge 5 cm. in breadth out of the liver. (Fig. 7.) The raw areas in the liver were brought together by eight mattress sutures of catgut. The gall-bladder was now freed down to a point where the cystic duct was not much thickened. It was tied off on both sides, and the duct cut across with a cautery. After all bleeding had been checked, three iodoform-drains were carried down to the stump of the cystic duct and to the under surface of the liver. The bleeding was slight and was reduced to a minimum.

In this case we were somewhat suspicious, from the thickening of the gall-bladder, from the densely adherent omentum, and the intimate relation between the liver and the gall-bladder, that a malignant growth was commencing, and consequently decided that it would be much safer at once to remove a wedge from the liver.

The patient was returned from the operating-room in good condition, and spent the remainder of this day fairly comfortably; she vomited once. On the second day she vomited 540 c.c.

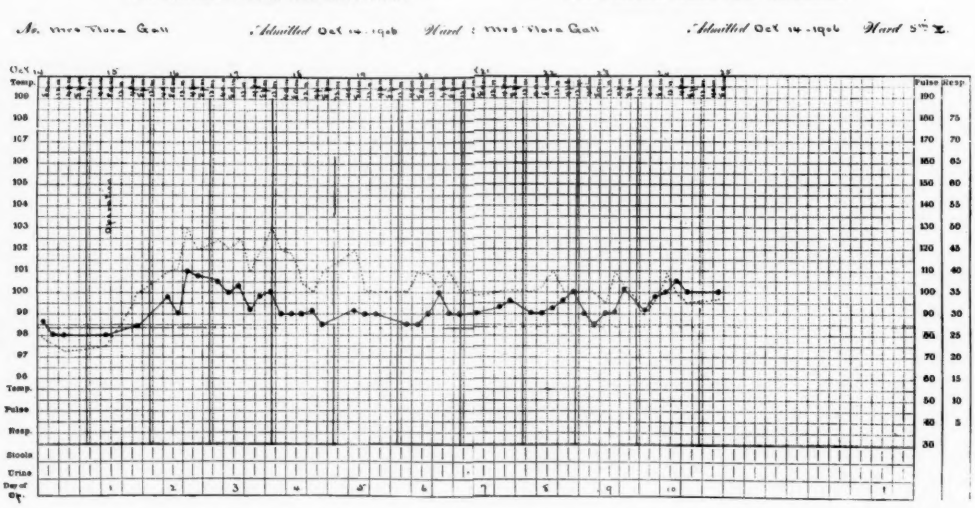


Fig. 8. As will be noted, at the time of operation the temperature was normal. On the next evening it rose to 101°, and then gradually dropped to normal, only once subsequently reaching 100.5°. The pulse at operation was normal. The next day it reached 130, and remained between 120 and 130 until the end of the third day, when it gradually dropped.

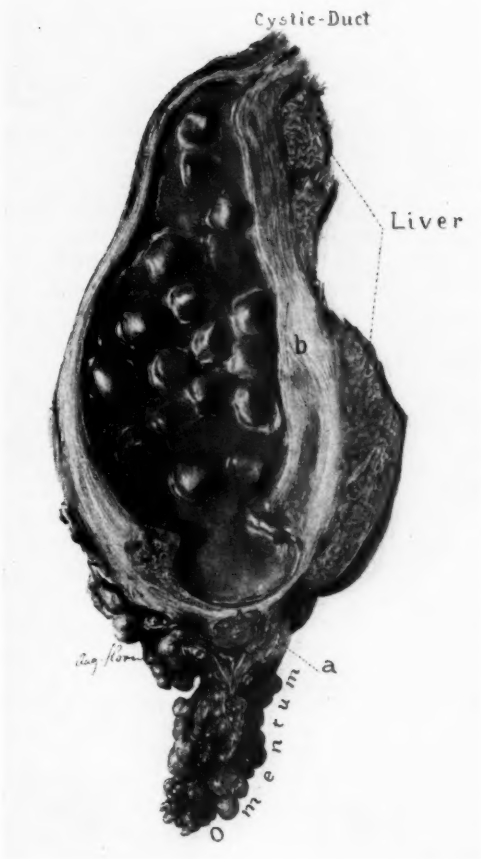


Fig. 9. Longitudinal section of a gall-bladder, showing adherent liver substance and a cavity filled with pus and gallstones. The cystic duct is considerably thickened. The gall-bladder is enlarged. Attached to its surface at two points are masses of liver substance. The walls of the gallbladder are much thickened, especially at *b*. At *a* there is atrophy, and had it not been for the adherent omentum, rupture of the gall-bladder at this place might very readily have occurred. The gall-bladder is filled with pus, and scattered throughout this are biliary calculi. See Fig. 7 for the unopened gall-bladder.

The pulse was about 130; the temperature dropped from 101° to 99° in the evening. On the second day there was considerable vomiting, and bile-stained fluid was present in large amounts on the dressings. This evidently came from the cut liver. Dressings changed on the second day were saturated. On the third day there was slight vomiting and the pulse was irregular. From this time on the patient made a very satisfactory recovery.

November 14, 1906. The patient's wound has healed, and she is to go home on the 17th.

Description of Gall-bladder. Gyn.-path. No. 10418. This specimen consists of the gall-bladder, a wedge of the liver, and of a densely adherent piece of omentum. The description and measurements are of the hardened specimen.

The gall-bladder itself is 9 cm. in length and is pyriform in shape (Fig. 7), varying from 1.3 to 5 cm. in diameter. The cystic duct is 8 mm. in diameter and considerably thickened. Intimately attached to the gall-bladder is a wedge of liver, 4 cm. in breadth and 4 cm. in length. This wedge of liver varies from 2 mm. to 2 cm. in thickness.

The omentum is snugly tucked down to the edge of the liver, and forms an almost integral part of the free surface of the gall-bladder for a distance of 5 cm.

On section, the gall-bladder wall is found to vary from 3 to 6 mm. in thickness. The inner surface presents a worm-eaten appearance, as if it were the wall of an abscess. At the fundus is a marked softening, the wall has given way over an area 1.2 cm. in diameter, and at this point the outer covering is only 1 mm. in thickness. Here it is that the omentum is most densely adherent. (Fig. 9 *a*.)

The gall-bladder is filled with pus, and scattered throughout the cavity are many yellow-faceted gallstones, which average 5 mm. in diameter. The relationship between the gall-bladder and the wedge of liver removed is intimate. The connective tissue of the gall-bladder wall can be seen penetrating the liver. It would have been impossible to separate the gall-bladder from the liver without a great deal of tearing. The danger of infection would then have been infinitely greater.

Cover-slips from the pus show quantities of polymorphonuclear leucocytes with detritus, and here and there long and narrow bacilli. No culture was made, as we wished to harden the specimen before examining.

Sections from the gall-bladder show that in some places the lining epithelium consisting of high cylindrical cells is intact, and that the gland-like spaces, due to depressions, present a characteristic appearance. The stroma of the folds at such points shows small round-celled infiltration, and here and there polymorphonuclear leucocytes. Polymorphonuclear leucocytes are also present between the individual epithelial cells, and the cavity of the gall-bladder contains desquamated epithelium, small round cells, leucocytes, and detritus. At other points the lining epithelium has entirely disappeared, and we have nothing but typical granulation tissue consisting of young connective-tissue cells, and capillaries, with here and there on the surface numerous polymorphonuclear leucocytes, and in the deeper portions cells that have taken up the brown pigment, evidently from hemorrhage. At one point in this granulation tissue we have a typical giant cell containing at least twenty-five or thirty small round vesicular nuclei,

bunched chiefly in the center. There is, however, no suggestion of tuberculosis. The underlying stroma shows a good deal of small round-celled infiltration, and in the walls are abscesses. The inflammatory changes persist throughout the walls of the gall-bladder. The adherent omentum has to a great extent undergone fibrous change; in some places there is little more than old connective tissue, with here and there foci with small round-celled infiltration. Clumps of fat globules — remnants of omental tissue — still persist throughout this fibrous tissue. The inflammatory thickening extends outward until it reaches the liver substance, and it is impossible to tell where this fibrous tissue stops and the capsule of the liver commences. The nuclei of the liver-cells vary considerably in size and in their staining qualities. We have a good deal of small round-celled infiltration and numerous eosinophiles. The eosinophiles are also abundant in the thickened wall of the gall-bladder.

Diagnosis. Acute and subacute cholecystitis, with large quantities of pus and gall-stones in the gall-bladder; implication of the adjoining liver tissue in the inflammatory process; dense omental adhesions undergoing fibrous change.

Removal of a wedge of liver substance with the gall-bladder certainly has a somewhat restricted field. Personally, in the majority of cases I would prefer to drain the gall-bladder merely, agreeing with those who consider the thorough drainage of the dammed-up bile as only secondary in importance to removal of the stones so frequently found.

In some cases it is impossible to remove the gall-bladder without tearing the liver to some extent, and in a limited number of cases one cannot exclude the possibility of carcinoma. In all such cases I think it just as well to be on the safe side, and to remove not only the gall-bladder, but also a wedge of the surrounding liver substance. We have found one disadvantage in the entire removal of the gall-bladder; that is, the sudden elevation — in some cases — of temperature after operation. In both of our cases there was, as will be seen from the charts, an elevation of temperature, but it gradually dropped to normal. In our case of resection of a portion of the liver for tumor, however, it will be noted that the temperature, which was over 102° at the time of operation, gradually dropped to normal.

SUTURE OF ACCIDENTAL TEARS OF THE LIVER

I have had two cases of this character. In the first there had been an abdominal abscess which had communicated with the liver, and in exploring the cavity I tore the liver substance. The bleeding was excessive, but was rapidly and completely controlled by four mattress sutures of catgut. In the second case, in removing an 89-pound subperitoneal, pedunculated myoma, a piece of liver substance was found adherent to the upper surface of the tumor. I was particularly anxious to close the abdomen without drainage, and by passing Hagedorn needles backward the bleeding was at once checked by a few mattress sutures of catgut.

Abscess between the abdominal peritoneum and omentum four weeks after labor; implication of the liver, the edge of the liver containing an abscess; secondary exploration in the region of the liver, with marked tearing of the friable organ; hemorrhage controlled with blunt liver-needles; complete recovery. [1]

Gyn. No. 12456. A. M., seen in consultation, October 20, 1905, and at once admitted to the Johns Hopkins Hospital. She is 36 years of age, married, white. Her family and previous history are negative. She complains of a good deal of abdominal discomfort and of fever. The patient has been married seventeen years and has had ten children; the eldest is 14 years of age; the youngest was born September 19, 1905, just one month before her admission. Her labors have all been difficult and instrumental, and on several occasions there was tearing of the perineum. Four years ago the perineum was repaired at the Johns Hopkins Hospital. For several days prior to her labor in September, she had been in bed with a fever. Her delivery was instrumental, and was followed by a most profuse hemorrhage. Fever and chills continued for four days after delivery, and since that date she has had chills and fever, and marked pallor has been noted. On admission to the hospital, she was exceedingly anæmic, with the hæmoglobin 26 per cent, and the leucocytes 11,200. There were distinct hæmic murmurs, but the heart was normal. The lung sounds were also normal. The right eye was inflamed; a white scar was visible on the cornea, and a distinct purulent exudate was made out.

The abdomen was distended. Just to the left of the umbilicus, and extending outward, was an indurated area 2.5 cm. in diameter. This was somewhat pointed. The lower part of the abdomen was hard and suggested a large abdominal tumor. There was no reddening. There was more or less tenderness over the entire abdomen, especially over the small tumor or elevation in the left side. On pelvic examination, nothing could be detected. The cervix was high up, the uterus was freely movable, and the appendages were perfectly free.

[1] Abstract from the *Johns Hopkins Hospital Bulletin*, p. 153, 1906.

Operation. October 21, 1905. An incision was made over the hardened indurated area on the left side. On opening the abdomen we encountered a large abscess containing foul-smelling pus. On careful exploration of the cavity I found that it continued upward almost to the free margin of the ribs and downward to within 8 cm. of the pubes. It apparently lay between the anterior abdominal wall and the omentum. No intestines or abdominal contents were to be seen. The cavity was loosely packed with iodoform-gauze, and the patient left the table in a precarious condition. Cultures from the pus showed no organism, but anaërobic cultures were not made. After a few days, large quantities of pus were discharged. The temperature kept up; the patient became delirous, and had to be isolated.

On November 3, 1905, the hæmoglobin was 25 per cent, and the leucocytes were 15,200. On the following day the patient was brought down to the operating-room, as her condition was not satisfactory. We could detect an area of induration along the free margin of the ribs on the right side. Artery-forceps were introduced into the opening, and carried out to where the induration had been detected on the right side. We then cut down upon the indurated area in the flank, an incision being made on the outer side of the rectus. The peritoneum was thickened, and there was much œdema in the peritoneal tissues. The liver was found lying just beneath the incision, and over a considerable area it appeared to be necrotic. It broke up very readily under the examining finger, and there was free hemorrhage. The insertion of three or four catgut sutures, however, with a blunt needle checked the oozing completely. We cut down on the edge of the liver and exposed a large pus-cavity.

Apparently the abdominal abscess had had its origin in the gall-bladder or had been a primary liver abscess, but in no way had implicated the pelvic organs, and had apparently been almost entirely anterior to the omentum. The patient gradually improved.

November 20, 1905. She was taken out of doors, although her condition was still precarious. From this time on her mental condition rapidly cleared up, and a decided improvement was noted each day.

She was discharged on December 21, 1905, with the abdominal wound completely healed. There was no tenderness at any point. The hæmoglobin was 76 per cent, and the mental condition was perfectly satisfactory.

Fig. 10. An enormous abdominal enlargement, due to an 89-pound cystic myoma. Sketch of the patient on the operating-table. The picture is taken from the right. The general thickness of the abdomen is clearly seen. The tumor projects downward, extending almost to the knees. It is readily seen why the incision was nearly four feet in length, because it extended from the xiphoid cartilage to the symphysis, the tumor being removed in its entirety.

In this case it was remarkable to see with what ease we could control the liver-oozing. It was only necessary to introduce a few catgut sutures through the friable material, and the bleeding was absolutely stopped. Had we used too much force, however, in tying, the sutures we would have undoubtedly cut through the liver tissue.

Successful removal of an 89-pound cystic myoma intact (Fig. 10); piece of liver 3 cm. in diameter removed with tumor (Fig. 11); suture of liver; recovery.

Mrs. McA., seen in consultation with Dr. Marshall Smith on June 25, 1906. She is 58 years of age. Twenty years ago she noticed a tumor in the lower abdomen, and was later seen in consultation by Dr. William T. Howard of the University of Maryland, who advised operation. The tumor gave her little inconvenience until three or four weeks before her admission to the Church Home and Infirmary, which she entered on July 27, 1906.

Operation. July 30, 1906. There was very marked abdominal distention. Prior to receiving the anæsthetic the patient was thoroughly washed up, and all preparations were made for the operation, so that she might

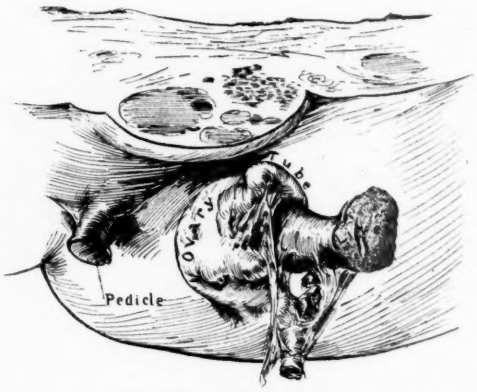


Fig. 11. A small segment of the wall of the cystic myoma, showing a piece of liver attached to its surface.

The cyst-walls in places reached 5 cm. in thickness. The pedicle of the tumor was very small. The tube and ovary were glued to each other by adhesions, and attached to them was a piece of liver substance which was so densely adherent to the appendages that it came away with the tumor.

remain as short a time as possible under ether. It was impossible for her to lie down; consequently she was operated upon in the sitting posture. The growth was removed with a great deal of difficulty, as it was everywhere adherent to the anterior abdominal wall and to the omentum. We found large vessels going to the tumor from the omentum, also numerous vessels from the stomach and transverse colon, some of them reaching fully 7 or 8 mm. in diameter. The adhesions were gradually shelled off by my hand, but I had to use the utmost care and do all liberating under sight, as the rupture of one large vein might have caused the loss of the patient's life before the hemorrhage could be checked. The pedicle of the tumor was not more than 1.5 mm. in diameter, and was situated directly beneath the ribs.

On removal of the tumor I found that I had brought away a piece of liver substance 3 cm. in diameter. We had no liver-needles handy, so I used a sharp Hagedorn needle, running the eye through instead of the sharp end. This device answered admirably, and the bleeding was easily checked by four catgut sutures. The uterus and the right tube and ovary lay under the surface of the liver. The abdomen was closed without drainage, and the patient made a very satisfactory recovery. In this case, of course, the removal of this huge myoma, which, as far as we can learn, is the largest myoma successfully removed, was the most important feature, and the bringing away of the piece of liver a minor consideration. The bleeding in the liver was checked with the utmost ease, in fact much more rapidly than we are usually able to control bleeding from the uterus; and furthermore, it was checked so thoroughly that we did not deem it necessary to drain the abdomen.

Liver surgery is still a vaguely explored field, and will certainly in the near future engross much of the attention of the abdominal surgeon. We agree thoroughly with the *dictum* of Mikulicz, expressed in the terse sentence: "To my mind, Kousnietzoff's needle is the egg of Columbus in the technique of liver surgery," and with W. W. Keen when he says, "After my experience with these three cases, I should hardly hesitate to attack almost any hepatic tumor without regard to its size."

APPENDIX

While operating on my first case I accidentally discovered the secret of applying liver-sutures. An assistant gave me a long, straight needle that had lost its point, and as we did not wish to delay, I used this, and was surprised to see the absolute lack of hemorrhage from the needle-holes. Several weeks later, when going over the literature, I found an article by Kousnietzoff, and read the hearty commendation of his work by Mikulicz. Later, I had needles made. These, instead of being wedge-shaped on cross-section, as were those of Kousnietzoff, are almost flat, and further, they are much more slender, making a smaller hole in the liver substance. The modifications are, however, so slight that these needles are merely improved Kousnietzoff needles, and all the credit for introducing the needle that will push the vessels to one side or the other instead of piercing them belongs to Kousnietzoff.

I sent long and curved liver-needles to some of my friends in different parts of the country. From one of them, Dr. M. H. Everett of Lincoln, Nebraska, I have recently heard, and he has had the same satisfaction with this method of suturing the liver as we have had, the control of the hemorrhage being perfect.

TREATMENT OF EXTENSIVE CYSTOCELE AND UTERINE PROLAPSE

By PROFESSOR DÜHRSSEN, Berlin, Germany

Translated by J. F. HULTGEN, M. D., Chicago

IN the June, 1906, number of SURGERY, GYNECOLOGY AND OBSTETRICS (vol. ii, No. 6), was printed an article by Watkins, entitled "Treatment of Cases of Extensive Cystocele and Uterine Prolapse," in which he recommends an operation for the cure of cystocele and uterine prolapse. This operation, he says, "was developed from Dührssen and Mackenrodt's operation for vaginal fixation in retroposition of the uterus."

Referring to his first publication in the *American Gynecological and Obstetrical Journal*, vol. xi, p. 99, he claims priority over similar procedures suggested by Schauta and Wertheim.[1]

Right here, however, I wish to record the fact that in 1894 (*Berliner klinischen Wochenschrift*, Nos. 29, 30) I described the very same operation of which Watkins speaks. I shall quote from this article ("Concerning a New Method of Laparotomy; Vaginal Cœliotomy") the two cases of most marked prolapse, in order to demonstrate the effectiveness of vaginal fixation in a combination of retroversion and of prolapse.

CASE 1. Total prolapse of both vaginal walls, marked elongation of cervix, descension of retroverted uterus, large ulcers on the portio vaginalis. *Operation:* November 10, 1903. Anterior and posterior colporrhaphy, vaginofixation and portio amputation. End of January, 1894: On examination, patient declares she feels like new-born. Vulva closes, vagina long and narrow; uterus is in normal anteversio-flexio, very small and atrophic, so that it can hardly be felt above the scar tissue in the anterior cul-de-sac.

CASE 2. Aged 58 years, ix-para. Subjective symptoms of prolapse. Anterior vaginal wall totally prolapsed, dry, and epidermized. Post-vaginal wall greatly prolapsed. Ectropion of portio, hypertrophy and large ulcers extending into even the cervical canal. Uterus movable, retroverted, 12 cm. long. April 14, 1894: After a 24-hours' reposition, uterus only 10 cm. long. Ulcer cauterized. Transverse incision in anterior vaginal wall; opening of the plica without preliminary ligature. One finger hooked over the fundus, and corpus brought out to the vulva. Vaginal and peritoneal edges sutured. Excision of a triangular portion of the anterior vaginal wall, the apex of which is near the urethra, and the base internal to the peritoneal catgut sutures. Two fixation sutures pass through the sides of this triangle and through the uterus. Large sagittal wedge excised from the anterior part of the cervix, transverse silkworm-gut sutures; knotting of the fixation sutures; sagittal closure of the vaginal incision. Time of operation, 36 minutes. June 6, 1896: At last examination patient complained of weakness only. Uterus small, anteflected; portio in spinal line; vulva closes; vagina long and narrow.

The first case I have reported again in detail.[2]

CASE 174. September 20, 1893. Aged 50 years; ix-para, with 4 abortions and 5 normal births. Menses scanty; only every two or three months. Subjective symptoms of uterine prolapse began after first birth, aggravated in last two years; both vaginal walls prolapsed; portio elevated, hypertrophied, and elongated very much; descent of uterus almost a procidentia, its length 9 cm. November 10, 1893: Intraperitoneal vaginal fixation. Uterus curetted; ulcers on cervix cauterized. Opening of vesico uterine fold; excision of entire anterior vaginal wall. Bladder pushed up; the extracted uterus is sutured to the vagina right back of the ureteral opening. Cervix-amputation, then sagittal closure of anterior vaginal incision, followed by colpoperineorrhaphy. Time, one hour. November 23, 1983: Patient discharged after a normal wound-healing. Vulva and vagina admit just one finger. Uterus in normal anteversio-flexion. January 24, 1894: Fixation sutures removed one week ago; patient feels well. Pelvic findings same as on last examination. Concerning this case, I said, (*ante*, p. 407): "Having excised a large oval piece in this case, the suturing of the wound edges, between which the uterus was brought to lie, was very difficult, because the oval was too large, which I avoided in case 183, (described on page 369,) with good results."

CASE 183. Mrs. X, ii-para. Suffered greatly from dysmenorrhœa, even as a girl. Sacralgia, nearly three years, aggravated in last year. Menses regular, painless, fairly strong, 5–6 days; slight menorrhagia. Since last birth, burning in hands and on scalp. Pelvic examination under narcosis shows uterus movable; both ovaries movable; ectropion and eversion of both vaginal walls; scar from an old perineal tear.

[1] These operations are really very similar to the one described by me as early as 1894. I do *not* mean that method of Wertheim in which the anterior surface of the uterus lies naked in the vagina (a purposeless operation), but the one of which Wertheim says, "Instead of waiting several weeks for the dermatization of the anterior surface of the uterus by granulations, the operation can be finished at once by covering the uterus with the anterior vaginal wall in this fashion: The vaginal mucosa is separated on each side of a median incision until the corpus uteri fit into this gap; resection of the flaps if too much vaginal mucus." *Technique of Vaginal Cœliotomy*. Leipzig, 1906.

[2] Report of 207 Vaginal Operations for the Relief of Mobile and of Fixed Retroflexion of the Uterus, with Special Consideration of the Permanent Results therefrom. Arch. f. Gyn., 1894, bd. xlvii, h. 2. s. 362.

Operation. Curettage; sagittal median incision in anterior vaginal wall; transverse incision near anterior part of median sagittal incision; vaginal mucosa separated laterally from the bladder, which is pushed up, and then the peritoneum pulled down with the finger and incised with scissors. Uterus pulled to the vulva with bullet-forceps. Tubes and ovaries also appear at the vulva, and, incidentally, a few small cysts of the ovaries are punctured with Paquelin cautery; then suturing of the womb in the urethral part of the vaginal incision by means of two silkworm-gut sutures. Some difficulty[3] in uniting the edges of the vaginal wound, which was finally done with a continuous catgut suture, while the portio was steadied with bullet-forceps. Posterior colporrhaphy with continuous catgut sutures. After the completion of the operation, the uterus is found in normal anteversio-flexion.

February 13, 1894. Patient discharged, with no subjective symptoms whatever; uterus in anteflexion; colporrhaphy wound healed by primary intention.

April 3, 1894. First menses after the operation, profuse and painful. Second menses normal; leucorrhœa. Removal of the two fixation sutures. Vulva and vagina narrow and resistant. Leucorrhœa lasted several months; uterus in anteflexion; still signs of endometritis.

July 15, 1898. Normal pregnancy; eight months. Seven weeks later, normal labor, lasting three hours; child weighs six pounds.

November 15, 1898. Feels well; vulva closes; perineum long; uterus small and anteflexed.

A comparison of the description of these operations in this case with the method given by Watkins shows that the two methods are absolutely alike, and that as early as 1893 (see case 1) I had extended my method of vaginal fixation of the retroverted uterus (with opening of the peritoneum) to the treatment for the reliefof prolapse and cystocele. In the course of years I have gathered a number of new ideas and experiences from a material of several hundreds of similar cases operated on by me.

1. For the cure of cystocele it does not suffice to separate the bladder from the anterior vaginal wall and cervix, but that viscus must be loosened from all its connections up to the ureters, when the cystocele disappears spontaneously, through simple retraction of the liberated portion of the bladder. The complete operative technique requires the full separation of the bladder from its own peritoneum, i. e., the plica vesico-uterina, and, above all, the thorough liberation of the lateral portion of the bladder from the parametrium, which is done with scissors or by blunt dissection until the ureters are laid bare. In three cases of prolapse which I operated on in New York (German Hospital, New York Post-Graduate School, and Smith's Infirmary, Staten Island), according to this method, I was able to show the ureters to those assisting me.

2. After taking these steps, the subsequent suturing of the uterus with the vagina does not need to be so strong; it is sufficient to use my method of vagino-fixation, in which one silkworm-gut suture is carried through the vagina, peritoneum, and upper part of the corpus uteri, and the sagittal peritoneal incision closed separately. By using these precautions, subsequent dystocia is avoided with certainty, and one is enabled to perform this operation upon young women who are still capable of conception.

It is therefore unnecessary to castrate these women, or to select uncertain methods of operation, as was suggested by Watkins. Case 183, moreover, demonstrates that even after extensive suturing of the vagina to the uterus and leaving open the peritoneal incision, subsequent pregnancy and labor may occur, and pass to term quite normally. Nevertheless I no longer recommend tight suturing in women of the procreative age, because it is superfluous for the relief of the cystocele, and may become dangerous at later births.

3. This method is suitable not only for cases of extensive cystocele and uterine prolapse, as Watkins says, but also for lighter degrees of cystocele, with descension of the retroverted or retroflexed uterus.

4. Small or extensive cystoceles with anteflected uteri can also be operated on by this method. This I have discussed in my work, *Limitation of Abdominal Section by Vaginal Laparatomy*, under the head of "Indications for Colpocœliotomy Anterior in Displacements of the Vagina." I mean here only those cases of prolapse of the anterior wall of the vagina which are combined with anteflexio-uteri, not those combined with a retroverted or retroflexed uterus. Such cases are the bane of the surgeon. There is marked relaxation, viz., atrophy of the anterior vaginal wall, which no longer resists the abdominal

[3] This difficulty is caused by the upward traction of the anterior vaginal wall by the tied suture, which is obviated by knotting the fixation sutures only after the closure of the vaginal incision. The fixation sutures must, however, be kept tense until knotted, lest the gut or omentum get between uterus and sutures, and thus be caught.

pressure, and thus leads to a bulging into the vagina; i. e., cystocele. Sometimes young women develop it after a faulty subinvolution, but elderly women at the menopause are the usual sufferers. In the latter, the advanced atrophy of the anterior vaginal wall is a great ætiological factor, and this thinning out also often involves the bladder-wall, which may be reduced to the thickness of a sheet of paper. The following three cases will illustrate the two classes of cases mentioned, as well as the operative procedures most to be recommended:

CASE 45. Aged 50 years; multipara; in menopause for two years; subjective symptoms of prolapse; uterus in anteflexion, normal size; anterior vaginal wall lies apposed to the vulva; cystocele the size of a hen's egg. *Operation:* July 28, 1898; T-incision; separation of vaginal flaps from the bladder; peritoneum incised and uterus extracted; four silk sutures are carried through the sagittal vaginal incision and the anterior wall of the corpus; only the upper of these four sutures passes through the peritoneal fold; continuous suture of the transverse vaginal incision. August 3, 1898, healing by primary intention; vagina barely admits one finger. Three months later, same findings; threads removed.

CASE 48. Aged 59 years; ii-para; in menopause ten years; symptoms of prolapse for years; pessaries for last two or three years, of no avail. *Examination:* Uterus small, anteflexed, strongly in retroposition; prolapse of bladder and of anterior vaginal wall. *Operation:* October 29, 1897; T-incision through the atrophic anterior vaginal wall; lower bladder-wall thereby injured with the knife, necessitating closure of vesical wall with a continuous catgut suture; loosening of bladder from the cervix and ligamenta lata, opening of plica, and suture of uterus into the vaginal incision; three catgut sutures are then passed through the longitudinal vaginal incision, the edges of the peritoneal opening, and corpus uteri; transverse vaginal incision closed as usual. Patient discharged cured, November 14, 1897.

The principle of the operation is: 1. To remove the cystocele by thoroughly loosening the bladder from its basal connections, thus producing a spontaneous retraction of the cystocele sac; and 2. To insert between the vaginal wall and the bladder a living cushion, which prevents the renewing of a vesical hernia.

The primary results of the operation were very satisfactory. At all events, it is more rational than the usual anterior colporrhaphy, which substitutes the atrophic vaginal wall merely by yielding scar tissue, and never produces anything approaching the retraction of the cystocele, which is effected by my method.

5. Another point in favor of my operation is this: In one case (p. 202 of my book), where, after a first labor, with cervix incision and forceps, symptoms of anterior cystocele with anteflexion of the uterus appeared, and were relieved by my operation, a second labor occurred, lasting twelve hours, with spontaneous delivery of a healthy child. Perineal tears occurred, which were not sutured, and, in consequence of which, anterior cystocele combined with anteflexio-uteri again occurred. From the foregoing we have two things: (*a*) Subsequent births are not to be feared after my operation; and (*b*) Recurrences are possible after a cystocele operation in case, at a following labor, the supporting rectovaginal septum be injured.

6. An accessory operation is often necessary, which is not mentioned by Watkins; namely, the amputation of a part of the cervix, or of the entire cervix, in cases of excessive cervical elongation with hypertrophy. A case of mine, in which I had done the cystocele operation with excision of the cervix, became pregnant and had a normal labor. (See *Berliner klinischen Wochenschrift*, 1903.)

The following is, in brief, my technique in these operations:

After shortening the cervix adequately, an inverted T-incision is made, the horizontal bar of the T being cephalad to and the extremity of the vertical bar of the T near to the urethral opening. The flaps are separated and kept apart with three Péans. (See Fig. 1, *a b c.*) This exposes the fundus of the bladder and its connections with the cervix and the parametrium. Strands of fascia between the bladder and its neighboring lower structures are either torn off, or cut after double ligation. (Figs. 1, 2, 3, *d d.*) After this, the bladder is loosened from the cervix and parametrium, and its own serous coat is pushed up so that it disappears spontaneously from the upper angle of the incision, and that by its own retraction. The corpus uteri thus becomes visible, and is now pulled forward with bullet-forceps, assisted or not assisted by the fingers. If no more births are to be expected, then I perform vaginofixation with three catgut sutures. (Fig. 3, *f f.*) If births are to be expected, then I fix

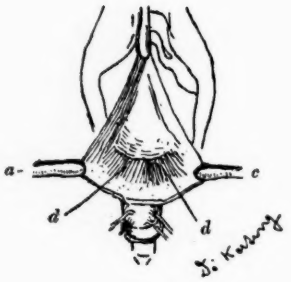


Fig. 1.

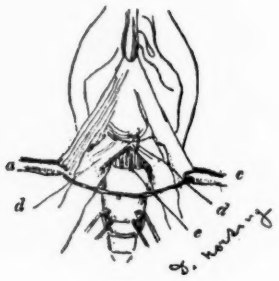


Fig. 2.

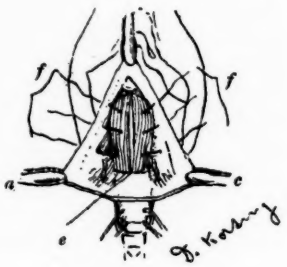


Fig. 3.

with only one silkworm-gut suture. In order to obtain fibroserous adhesions, it is well, in elderly women, to push the serous covering of the bladder well upward (Fig. 3), and, if necessary, to resect some of the excessive bladder serosa. Resect the vaginal flaps (Fig. 3, punctuated line), if necessary, close the transverse incision, knot the fixation sutures laterally, and put a gauze strip as drainage near the center of the transverse incision. Finish the operation with a colpoperineorrhaphy or with a Tait operation.

Patient gets up from her bed in twelve days, and is discharged after fourteen days. A later examination will show the anterior vaginal wall pulled upward by the normally located uterus. The patient is able to resume her work again.

I must, right here, defend my operation against the objections of Gebhardt (1, 2, 5), who claims that the remote effects of my operation are bad, while, as a fact, they are very good, as Gebhardt may gather from the study of my book, and as many prominent colleagues have affirmed. I deny, moreover, that I have experimented a great deal with my vaginofixation. I have given two methods: one without opening the peritoneum, which, with a movable uterus, gives good permanent results, and the second, one with opening of the peritoneum, whereby the suturing of the peritoneal edges causes us trouble at subsequent births. I should like to hear of one case operated on according to my method, practised since 1895, with separate suturing of the peritoneum, in which there was any obstructions to labor. Until I hear of such a case, I shall designate as without foundation all warnings referring to vaginofixation as a cause of subsequent dystocia.

Even lack of knowledge of the literature will soon cease to be an excuse for such fears. If Gebhardt's objections are correct, then his own vaginal ventrofixation would have at least some slight *raison d'être* which I absolutely reject in view of the excellent results obtained from my vaginofixation. A recent article by Bornet (*Zeitschrift für Geburtshülfe*, bd. xiv, h. 2) shows that notwithstanding my numerous publications, the salient feature of vaginofixation is very little known. In a case with previous vaginofixation, he found it necessary to perform the classic Cæsarean section, alleging that the vaginofixation had not been done correctly, because the fixation sutures had not included the fundus high up. Now, in a well-executed vaginofixation only one silkworm-gut fixation suture through the body at its junction with the fundus uteri is necessary (the opening in the peritoneum, however, must be sewed up separately). Then, and then only, may one expect permanently good results. Where the peritoneal plica was not sutured separately, I consider the vaginofixation improperly executed. In this case, moreover, delivery per vias naturales would have been very feasible; namely, with my method of vaginal Cæsarean section.

Early in May, 1906, while present at a meeting of the New York Gynecological Society, I heard Goffe describe a prolapse operation which is very similar to mine, and which has given him very good results. There is practically no method which is as serviceable as this one. Ventral cœliotomy, and even the Alexander-Adams operation, cannot compete with

it, since they do not take care of the cystocele. It is only by means of vaginal hysterectomy with anterior and posterior colporrpaphy that similarly good results can be obtained, provided the bladder is loosened in the same way from the cervix, vagina, and parametrium. Conservative vaginofixation, however, is, in general, to be preferred to the mutilating operation of extirpation of the uterus.

I have had the preceding steps of my operation illustrated, and shall publish them soon.

BIBLIOGRAPHY

1. Zeitschrift für Geburtshülfe, bd. xlv, h. 1.
2. FEHLING V. HERFF. Centralblatt für Gynäkologie, 1899, No. 41.
3. SCHAUTA. Schmidt, Monatschrift für Geburtshülfe.
4. KÜSTNER. Cohn, Zeitschrift für Geburtshülfe.
5. BIELING UND KAUFFMANN. Diss., Berlin, 1898, und Zeitschrift für Geburtshülfe, bd. xlii, h. 1.

NEWER METHODS IN THE DIAGNOSIS OF KIDNEY DISEASES

CONTRIBUTED BY DR. G. KAPSAMMER, VIENNA, AUSTRIA

TRANSLATED BY CHARLES M. MATTER, M.D., CHICAGO

ALTHOUGH Brenner of Vienna invented the first practical uretercystoscope in 1887, thereby making it possible to develop the diagnosis of surgical diseases of the kidney, yet it was neglected by those who had made a name for themselves in the domain of renal surgery. Up to the beginning of the twentieth century the question of nephrectomy depended only upon the *presence* of the second kidney, without, as a rule, trying to ascertain its anatomical or functional condition. Up to the very latest period, evidence of disease in the kidney that was to be left was a contraindication to removal of the other.

At present our views are essentially different. We know that we can extirpate one kidney, even if the other is damaged up to a certain extent. Therefore, in establishing the indications for nephrectomy, we have to answer the question, Does the degree of anatomical destruction of the second kidney and its consequent functional disturbance allow a removal of the first one?

On account of the fact that the older well-known methods of examination were insufficient when applied to the separately collected urines of both kidneys, other methods were devised and tried, that should determine the degree of functional disturbance, and thereby the extent of the anatomical lesion in each organ.

Before going more deeply into these newer methods, I wish to state that I consider the double uretercystoscope to be the only reliable instrument for the separate collection of urine from each kidney. This apparatus, contrary to all other appliances which have been devised to avoid ureteral catheterization, allows the *simultaneous and separate collection of urine from both kidneys without passing the bladder mucosa.* It seems to me superfluous to speak about the above-mentioned instruments, since the fifteenth international congress at Lisbon in 1906 declared ureteral catheterization the best method.

I make it a rule to catheterize both ureters. Many, however, propose that only the ureter leading to the diseased kidney shall be entered, so as to avoid the possibility of infecting the presumably healthy one. This I do not believe to be advisable, for two reasons: 1. We always aim to make an early exact diagnosis, remembering that often in the early period of the disease double ureteral catheterization is the only way to find the seat of the lesion. 2. We wish to be exactly posted as to the functional condition *of the healthy kidney* when we know which side is affected. In order to prevent infection, I make a prophylactic *instillation* by the following method in every case: After passing the catheter about 5 cm. up the ureter, I leave the cystoscope in position. When the examination is over, about 4 c.c. of a one-per-cent silver nitrate or a 1–1000 corrosive sub-

limate solution is instilled in the ureter while the catheter is being drawn out, thus disinfecting that part of the canal which comes into contact with it. This procedure has also the advantage of being painless. By this method I have sounded the ureters over one thousand times without the slightest untoward after-effects, notwithstanding that I have even catheterized the healthy ureter from a tubercular bladder.

The newer methods of the functional diagnosis of kidney diseases may be divided into two groups. To the first class belong those in which the blood and urine is examined by methods founded upon the later achievements of physiological chemistry. This includes kryoscopy, estimation of the indices of refraction, and estimation of the resistance to the electric current.

To the second group belong those which depend upon artificially influencing the kidney functions by the subcutaneous introduction of foreign substances into the body; as iodine, salicylic acid, fuchsin, methylene blue, rosaniline, indigo-carmine, hippuric acid, phloridzin, and experimental polyuria.

Of the first class, the kryoscopy of the urine and blood has been the only one that has achieved a transient importance. As far as the urine is concerned, it does not, in spite of the oft-repeated theoretical differences, help us practically any more than the estimation of the specific gravity. Therefore, as the more complicated method, it is herewith disposed of as an aid to diagnosis.

However, kryoscopy was thought to be of importance diagnostically in still another way. It was thought that one could judge the kidney function, not by the number of molecules excreted through them, but by the number that were retained in the blood. According to Koranyi, the blood-freezing point has a constant value of $-0.56°$ C. Kümmell was the first to use this method as a basis in placing the indications for removal of a kidney. He expressed his ideas in two fundamental statements.

"If the blood freezing-point is $-0.58°$ C. to $-0.60°$ C., it indicates a bilateral renal disease, a bilateral disturbance of function, and therefore a contraindication to nephrectomy."

"The normal blood freezing-point of 0.56° C. excludes a bilateral functional disturbance. If one knows which side is affected, nephrectomy can be done without danger."

On the other hand, it has been noticed that the blood freezing-point of healthy persons can vary within relatively wide limits. (Tuffier, de Grazia, Engelmann, Köppe, A. Kock, Rovsing.) An increased molecular concentration has been found in diseases of other organs, and a decrease in anæmia, cachexia, and hydræmia. On account of these facts, Kümmell's method has not found any wide application in actual practice. To sum it all up, we may therefore say that the methods of the first group are of no practical importance in functional diagnosis.

Of the second class, only the methylene-blue, phloridzin, indigo-carmine methods and the experimental polyuria have found any extended application. As the indigo-carmine test of Voelcker and Joseph possesses all the advantages and relatively none of the disadvantages of the methylene-blue method (its excretion as a chromogen), it has displaced to some extent the older method of Achard and Castaigne. The chief value of the indigo-carmine test for the present lies in the fact that the type of excretion and the ureteral openings are clearly shown by the bluish jets;. of course, only if the kidneys functionate. No doubt it is of great value in connection with ureteral catheterization; but more needs to be known about it.

The method of experimental polyuria of Albarran, together with ureteral catheterization, consists in giving the patient from four hundred to six hundred grams of some diuretic mineral water, collecting the urine in separate portions every half-hour, and determining in each the total molecular concentration and the percentage and absolute amounts of urea, sodium chloride, and phloridzin sugar. This test will hardly come into extensive practical use, for several reasons: 1. We know that the ability to excrete water usually suffers last, at a time when the diminished excretion of the solids is marked and easily recognizable. 2. Then, also, the use of a diuretic tea or mineral water is a factor the extent of whose influence we know very little of. 3. We cannot accurately

estimate the amount of urine from each kidney, because the escape of some of it alongside the catheter can often not be prevented. 4 (and lastly). Such an examination takes too much time (for experts, over three hours). While it is, no doubt, of the greatest theoretical value, we must not forget that we need a method that will make known to us the functional ability of the kidney in the *shortest possible time*, and by the *simplest of means*.

The method that will accomplish this seems to me to be a modification of the phloridzin method, as published by me in 1904. It is known that the phloridzin sugar is formed in the kidneys, and that it is not produced if they are gravely diseased. In 1901, Caspar and Richter introduced the phloridzin test, combined with ureteral catheterization, as an aid to the functional diagnosis of kidney diseases. Their technique consisted in injecting 0.01 gram phloridzin subcutaneously, and then estimating the percentage of sugar in the separate urines. They claim that the percentage of sugar in the urine lies in direct proportion to the amount of healthy kidney tissue remaining. The fact that some urine usually escapes alongside the catheter, and that there is often a reflex polyuria set up by the sounding of the ureters, diminishes the value of the laws promulgated by these two writers. I showed in 1903 that ureteral catheterization frequently acted as an irritant. While this irritation occasionally reflexly caused a diminished flow of water, usually an increase was the result. As this increase affects only the water and not the solids excreted, the percentage of the latter and the sugar will sink according to the grade of polyuria. This can easily lead to serious mistakes, on account of the fact that often only one kidney, especially the healthy one, will react to the sounding with a polyuria which will lower the sugar percentage on its side below that of the diseased organ. It is therefore important to estimate the absolute amounts of sugar. These absolute quantities are, however, difficult to obtain, on account of the escape of urine alongside the catheter.

I have observed that lesions of the kidney affect not only the amount of sugar, but also *the time required to secrete it*, and on this observation I have based the following method. Both ureters are catheterized, and the first portions are subjected to chemical, microscopical, and bacteriological analysis. Then 1 c.c. of a fresh warm sterile one-per-cent solution of phloridzin is injected hypodermically, and beginning ten minutes after, the test-tubes are changed every five minutes. In case of a normally functionating kidney the sugar will appear ten to fifteen minutes after the injection. However, in proportion as it is diseased, the later will the glycosuria appear. In placing the indications for nephrectomy, I have found that an organ from which sugar appears thirty minutes after injection, while it may be anatomically and functionally damaged, is still able to perform the duties for the whole organism. If the sugar appears later than forty minutes after injection, in the urine of the kidney that is to remain, extirpation is contraindicated.

A great advantage of this method is, that by it we can get quickly informed by examining the mixed urines of both kidneys in the bladder. If sugar appears ten to fifteen minutes after injection, in the bladder urine, at least one kidney is able to functionate properly. If, however, it appears later than forty minutes, nephrectomy is not to be considered.

I wish especially to emphasize that these statements are true for all cases, with the exception of certain forms of parenchymatous nephritis (marked albuminuria and cylindruria). The conditions underlying a parenchymatous nephritis, and causing an exception to the methods of the second group, need more study in order to be cleared up.

After all that has been said on this subject, it seems queer that it has been proposed (Rovsing) to free the kidney in an exploratory operation in cases of suspected contracted kidney or cystoma renalis. Even exploratory section of both organs was advised. It has been shown by many, however, that the freeing or section of the kidney is not in all cases capable of giving a correct anatomical picture of the conditions present. Kidneys that on section are macroscopically perfectly normal may show severe lesions microscopically. To get an exact idea, a histological examination would be necessary. This result, however, is accomplished by using the phloridzin method, and noting the time it takes for the sugar to appear in the urine.

THE LYMPHATIC GLANDS IN PREGNANCY

From the Obstetrical Department of the Johns Hopkins Hospital

By ARTHUR W. MEYER, M.D., Baltimore
Instructor in Anatomy at the Johns Hopkins University

THE marked ability of the lymphatic glands and their quick response in various pathological states are matters of almost daily observation. Attention has also been called to the fact that slight changes in metabolism due to digestive disturbances; mild friction from trusses and other causes; irritative lesions unobserved by the patient, as the existence of carious teeth; a latent otitis media, or a balanoposthitis too indolent to attract attention — all may transiently, or even permanently, affect the structure, size, and consistency of the lymphatic glands of a given region or of the entire body. Besides these mild pathological processes, other conditions, such as abstinence, pregnancy, lactation, the menopause, and old age, which lie, perhaps, on the border line between the normal and the pathological, have been regarded as influencing the whole lymphatic glandular system more or less profoundly. Since these changes manifest themselves, in part at least, by variations in the size and consistency of the individual lymphatic glands, it seemed worth while to make some observations on a series of at least fifty cases in some one of these conditions.

For the purpose of such observations, the state of pregnancy seemed to offer special advantages. Complete histories are kept by the obstetrical staff. The patients, as a class, are perhaps as near the normal as obtainable in that rank in life, and could be under observation for a sufficiently long period. Any lesions could be observed daily. Besides, there was little in the daily hospital life of these women, many of whom were healthy young primipara, that would be likely to cause any sudden change in the lymphatic glands.

Through the kindness of Professor Williams, an opportunity was afforded to palpate systematically the lymphatic glands of the obstetrical cases in the maternity wards of the Johns Hopkins Hospital. I am further indebted to Professor Williams for the unrestricted use of the full records of these cases. This was a great saving in time, and gave me many indispensable *data*.

A series of fifty-nine cases was palpated weekly during a period of from two to twelve weeks. The greater number of examinations was made before labor. Only one or two examinations were made during the puerperium, as a rule, because patients are dismissed two weeks after a normal labor. The ages of the patients varied from sixteen to forty years. About twenty-five per cent were between sixteen and twenty years, sixty-five per cent between twenty and thirty, and ten per cent between thirty and forty. Thirty of these cases were white women, and twenty-nine black. The examinations were invariably made with the patient in bed, relieved of all restrictions of dress. This assured as complete muscular relaxation as obtainable, and afforded the freedom necessary for an effective examination. Usually these examinations were made on the same day of the week and same hour of the day. The morning hour — 9 A.M. — was chosen because any possible daily influence due to meals, restrictions of dress, or tension on the breasts or the abdomen were thus largely, if not entirely, eliminated. A special effort was made to obtain a series of palpations on the third day after delivery, in order to observe the effect of the onset of lactation on the axillary and infraclavicular lymphatic glands. Most of the cases were examined once only after delivery, some twice, and a few half a dozen or more times. Cases of generalized infections, such as tuberculosis, were excluded.

All the accessible lymphatic glands, save the popliteal, were examined weekly in the following order: Suboccipital, posterior auricular (mastoid), anterior auricular (parotid), buccal, submaxillary, suprahyoid (submental), superficial and deep cervical, supraclavicular, infraclavicular, supratrochlear (epitrochlear), axillary, and inguinal. No attempt was made to distinguish the buccal and inferior mandibular,

the pectoral, subscapular, and external axillary, or the inguinal from the subinguinal groups. In the case of the axillary glands, it was noted, however, whether the palpable glands were seated in the pectoral region, in the depth of the axilla, or in both regions. Nor was it thought advisable to count carefully the number of palpable glands in each region or group. A few attempts to do so — in the axilla, for example — convinced me that in the great majority of cases this was quite a fruitless undertaking. The varying depth and great mobility of the overlying panniculus, and the demands of such an examination upon the patient, made it unlikely that any reliable results would be obtained. Besides, the varying position of a voluminous corpus mammæ would further increase the difficulty by affecting the position of the pectoral group. Consequently, it seemed advisable to concentrate all attention on the question of palpability, on the approximate number of palpable glands — their size, consistency, and position — and on the firmness of the musculature, its state of relaxation, and the depth of the overlying panniculus. To designate the size of the glands, such expressions as "barely palpable," "small," "large," and "very large" were found helpful. These are not very accurate terms, but, since the object of this investigation was to determine merely whether or not any *change* in the lymphatic glands in pregnancy could be observed, they answered the purpose sufficiently well. It is evident that in such an examination as this the personal element, unfortunately, is an important and unavoidable factor. To eliminate this as far as possible, the memoranda of each succeeding week were made independently of those of the previous weeks, and after comparing them, the case was again referred to immediately for confirmation or rejection of any new observation. All examinations were made in ignorance of the past history of the patient, and, as far as possible, of the character of the present labor and puerperium. For these facts the histories were consulted after the tabulations had been made. In order to guard against the assumption that any enlargement found was dependent upon the conditions of pregnancy and lactation alone, every effort was made to obtain those factors in the past or present history of the patient which might have a bearing on present conditions. The questions of glandular tuberculosis, affections of the breasts, skin, teeth, and scalp, of sore throat and tonsilitis, and venereal disease were made the subject of special inquiry. Unfortunately, information regarding venereal diseases is avowedly unreliable. Lues would, of course, be an important factor in general enlargement, and gonorrhœal complications in local. Yet, for the determination of *glandular changes* in pregnancy, all these past affections have a modifying influence only, for it is unlikely that sclerosis following any of them could often have been so complete as to preclude all capability of reaction on the part of the affected gland or glands. Moreover, all factors in a past generalized lymphadenitis are only of primary importance, when the question of what is normal or that of the palpability of the lymphatic glands in pregnancy is concerned. The first has been excluded from this inquiry. The results regarding the second can only be accepted with qualification. The existence of any active glandular or venereal disease would, of course, have been detected, and could then have been reckoned with.

The following table gives a summary of the most important results of this study. Others will be spoken of in the discussion. The only case not included here is one of generalized tuberculosis, in which the glands in every one of the above-named regions were enlarged.

SUMMARY OF RESULTS

Ages of patients varied from ten to forty years.

Total number of cases, 59. No glands palpable at any examination, 1.

Glands palpable in all regions examined, *nil.*

Axillary glands palpable at some time, 58 (98.3%).

Inguinal glands palpable at some time, 58 (98.3%).

Submaxillary glands palpable at some time, 44 (74.6%).

Axillary glands palpable at every examination (fluctuation observed), 39 (66.1%).

Inguinal glands palpable at every examination (fluctuation observed), 37 (62.7%).

Submaxillary glands palpable at every examination, 26 (44.2%).

Supratrochlear glands palpable (no fluctuation in size noted), 18 (30.5%).

Posterior auricular glands palpable (no fluctuation in size noted), 6 (10.1%).

Superficial cervical glands palpable (no fluctuation in size noted), 3 (5%).

Suprahyoid glands palpable, 1 (1.7%).

Progressive enlargement of axillary glands noted, 15 (25.4%).

Progressive enlargement of inguinal glands noted, 9 (15.2%).

Enlargement of axillary glands with onset of lactation (24 cases examined), 15 (62.5%).

Axillary glands no longer palpable in second week of puerperium, 1.

Axillary glands much enlarged and tender (two weeks) before delivery, 1.

Decrease in size of inguinal glands after delivery (37 cases examined), 8 (21.6%).

This summary does not reveal the fact that the glands in similar regions were often larger on one side of the body than on the other. Nor does it show in how many instances there was an entire inability to palpate the glands of a given region on one or the other side. Such discrepancies in similar regions on opposite sides were most frequent in case of the axillary, submaxillary, and supratrochlear glands. The differences in the inguinal region were less marked. In case of the axillary and submaxillary glands, variations were to be expected, and an explanation was usually not difficult to find. Present or previous affections of the teeth, mouth, and throat were usually responsible for the former, and those of the breast, arm, or of the axilla for the latter. The differences in case of the supratrochlear glands on opposite sides are harder to account for. It was very difficult to find any good reason in the past history, as a rule. In a few cases, boils or infections following injury to the fingers or forearm were likely responsible. It is probable that patients forget the slighter lesions below the elbow, but remember with special vividness a toothache, tonsilitis, breast abscess, or boils in the axilla. Then, to be sure, the wide anatomical variations in the size and number of the supratrochlear glands must be borne in mind. The buccal, supraclavicular and infraclavicular, and suboccipital glands were never definitely palpable. This was rather to be expected in all, save the infraclavicular glands. We know that some of the lymphatics from the breast run into these glands, and so, *a priori*, might have expected to find them enlarged in connection with the post-partum changes in the breasts. Yet they were never felt, even in cases in which the axillary glands were enlarged very markedly a few days after delivery. This fact may be accounted for, however, by their comparative inaccessibility, and by the small nature of the lymphatic vessels which pass to them. A single deep cervical gland was found a few times only.

By reference to the table it will be seen that there was only one case in which no gland could be palpated in any region of the body. This case was that of a white woman twenty-nine years old, who was the mother of five children. The present puerperium was afebrile, there was no injury during labor, but manual removal of an adherent placenta was necessary. Her past history was unimportant, save that she had "children's diseases," suffered an abortion, and that the placenta had also been removed manually at previous labors. This case was under observation for seventeen days only. One examination was made ten days before labor, and a second one seven days after. Both were negative.

In a second case — that of a young negro woman of sixteen years, who had not walked until six years of age, because of rachitis — no glands could be palpated on two successive weekly examinations. On the third examination the right axillary glands were felt distinctly, but the inguinal glands were recorded as "barely palpable." In spite of the fact that she gave a history of very bad teeth — temporary set(?) — the submaxillary glands, which were unusually inaccessible, could never be definitely felt. At the fourth examination the axillary and inguinal glands of both sides were palpable, and were recorded as small on two successive examinations. At the seventh examination, made three days after delivery by pubiotomy, the axillary glands were again recorded as small. On account of the strapping on the pelvis, the inguinal glands were not palpated for five weeks. The axillary glands meanwhile became non-palpable at the ninth examination, sixteen days after delivery, though maternal

nursing had occurred throughout. They were never palpable again, although the patient was seen for four weeks after delivery. The inguinal glands on the right side were not palpable the fourth week after delivery. On the left side — the side on which pubiotomy had been performed — one gland, lying immediately below the saphenous opening, was easily palpable.

The axillary and inguinal glands were palpable in 98.3 per cent of the cases at some time during the period of observation. The submaxillary glands were palpable at some time in 74.6 per cent of the cases. The axillary and submaxillary glands were found tender occasionally; the inguinal glands, never. Tenderness of the axillary glands was invariably accompanied by engorged breasts, either before or after labor; that of the submaxillary, by toothache, carious teeth, or sore throat. Axillary and submaxillary glands which were very much enlarged were often not tender. The tenderest glands, whether large or small, were always found on the side of the most engorged breast, although if this increase in tension had occurred very gradually, tenderness was usually absent. Progressive enlargement of the axillary glands was noticed in 25.4 per cent of the cases, while a more or less marked enlargement with the onset of lactation was noticed in 62.5 per cent of the cases examined approximately three days after delivery. A decrease in size after the first week following delivery was noticed in most cases in which enlargement had occurred, but in one case only the axillary glands were non-palpable before the end of the second week. Owing to the death of the child, maternal nursing had not taken place in this case.

Whether or not the enlargement of the axillary lymphatic glands is due primarily to the local changes in the mammary gland incident to pregnancy, or directly to pregnancy itself, it is impossible to decide. The former seems the more likely, however. This view obtains some support from the fact that a more or less marked sudden enlargement of the axillary glands was observed in 62.5 per cent of the twenty-four cases examined at the onset of lactation, while a slight progressive enlargement was observed in but 25.4 per cent. To be sure, a gradual increase in size is harder to detect, but, since many of the cases were examined half a dozen times before labor, it does not seem likely that any enlargement, however gradual, unless very slight, would have failed to reveal itself between the first and sixth examinations made six or more weeks apart. The above conclusion is further supported by the observation that this glandular enlargement was most marked in women with large, active breasts, and least in those in whom there seemed to be a small, poorly functionating mammary gland. In one case, in which aberrant lobules of mammary gland extended into the axilla, a sudden enlargement of the adjacent lymphatic glands coincident with engorgement of the breasts was noticed on three successive examinations made at intervals of several days during the puerperium. After the tension had been artificially relieved, a marked decrease in size of the enlarged glands was noticeable within twenty-four to forty-eight hours. The increase in size of the axillary glands in this case was so evident, and was accompanied with such marked tenderness, that, upon making the first examination, the condition suggested the presence of an active inflammatory process. The fact that no progressive change was observed in the submaxillary, mastoid, or supratrochlear glands, or of those in any other region, also seems to confirm the conclusion that the enlargement noticed in the axillary glands is largely due to local causes. The glands in the above-named three regions are very accessible, and can be palpated with far greater accuracy than the axillary groups, yet no fluctuation in them was ever noticed in cases in which local irritative lesions were absent. Certainly, there is no good reason to suppose that glandular changes due primarily to pregnancy should manifest themselves exclusively in the axilla and the groin, or why such changes should appear most strikingly several days after the termination of pregnancy. Not infrequently the group of pectoral glands were strikingly enlarged with the onset of lactation, while those in the depth of the axilla were only slighty affected. This, too, seems to show that the enlargement of the axillary glands is mainly due to changes in the breasts, and that those glands which lie nearest to the mammary gland are first affected. When no special change in

the size of the axillary glands had taken place, it was usually easiest to palpate the central axillary group. This was probably due to their location. They could be rolled much easier between the thoracic wall and the finger-tips than the pectoral group. Since the hæmatogenous and metabolic changes that occur during pregnancy are, in the nature of things, general, and not local, they may rightly be expected to affect all glands, even if not to a like extent. That the lymphatic glands of the whole body must be affected by pregnancy itself seems likely, but it is probable that these changes are slight, gradual, often transient, and that the enlargement noted depends primarily upon local conditions *resulting from pregnancy*. None of the fifty-nine cases came under observation in the first weeks of pregnancy. Consequently no *data* were obtained showing how early this enlargement of the axillary glands manifests itself. It is, of course, possible that the beginning of these changes might be coincident with the first symptoms in the breasts in the early weeks of pregnancy, or, at least, with the first increase in size of the breasts after the second month. If this be so, then the gradual enlargement of the axillary lymphatic glands in all cases may have its origin in these changes in the breasts which begin a few months after conception.

A progressive enlargement of the inguinal glands was observed in 15.2 per cent of the cases, and a decrease in size after delivery in a like percentage of cases. Since the abdominal relaxation, and the consequent relaxation of the skin and fascia in the groin after labor, makes it easier to palpate the inguinal glands, this decrease in size, noted in 15.2 per cent of the cases, seems especially significant. It seems to suggest that the decrease in size was primarily dependent upon the termination of pregnancy, for it followed directly, although gradually, upon that event. However, it does not follow that the changes in the blood and in metabolism are the causative agents. That the enlarged uterus often causes marked congestion of the venous circulation of the lower extremities is well known. There is no reason to suppose that the inguinal lymphatic glands escape the effects of this congestion or that they are unresponsive to it. Nor can it be assumed that a similar obstruction to the lymphatic currents, notably those passing through the gland of Rosenmüller and up the main lumbar trunks, can be excluded. Since delivery completely removes the mechanical causes of obstruction, a decrease in size of the inguinal glands could be expected to follow. The increase in size of the inguinal glands noted in 15.2 per cent of the cases before delivery could be similarly explained.

The factors of age and multiparity were not observed to have any modifying influences on the changes noted. Nor was there sufficient evidence to show that the existence of a leucorrhœa, the occurrence of injury at birth, operative procedures at delivery, or a febrile puerperium produced a recognizable change in any of the glands in the regions palpated. In one case in which there was a pronounced leucorrhœa, and in which the child suffered from a severe purulent ophthalmia, an enlargement of the inguinal glands was observed three days after labor. This increase in size was transient, however, for it could not be recognized on the tenth day of the puerperium. The latter was afebrile, and there was no injury at birth. The fact that perineal or vaginal tears were not accompanied by recognizable reactions on the part of the inguinal glands is undoubtedly attributable to aseptic methods of delivery.

The character of the individual glands did not vary greatly as to consistency or shape. The inguinal glands were invariably firmer and flatter than the axillary, and resembled the submaxillary glands in firmness. The latter were generally found oval in shape, and hard. Any comparison is apt to be misleading, however, because of the variations in local conditions. In the axilla the lymphatic glands are, in most cases, imbedded in abundant fat, and are covered with a thick panniculus. In the groin there is a scant but firm covering and a fairly firm floor, while the submaxillary glands can be grasped readily between the finger-tips and the jaw — two unyielding bodies. Besides, it is known that the inguinal glands undergo an early sclerosis. It is also probable that venereal diseases must have affected these glands in a large percentage of these women; at least, this seems likely in case of the multipara, even if no such history could be elicited. Such a

prolonged irritative lesion, even if indolent, would be a cause for sclerosis, and perhaps of permanent enlargement of these glands. The relation of carious teeth to the enlargement and sclerosis of the submaxillary glands as found in these cases confirms this view.

COMPARATIVE TABLE OF RACES

	Total Number of Cases	White	Black	Percentage	
				White	Black
1. Total number of cases examined	59	30	29	.....	.....
2. No glands palpable in any region	1	1	....	3.3	.....
3. Axillary glands palpable at some time	58	29	29	96.6	100
4. Axillary glands palpable at every examination	39	20	19	66.6	65.5
5. Progressive enlargement of axillary glands noted in.....	15	5	10	16.6	34.4
6. Enlargement of axillary glands with beginning lactation: 24 cases examined—12 white and 12 black	15	6	9	50.0	75.0
7. Axillary glands non-palpable at end of second week of puerperium	2	1	1	3.3	3.4
8. Inguinal glands palpable.....	58	29	29	96.6	100
9. Inguinal glands progressively enlarged	9	6	3	20.0	10.4
10. Inguinal glands decreased in size after labor: 37 cases examined—19 white, 18 black.....	8	2	6	10.5	33.3
11. Submaxillary glands palpable at some time	44	19	25	63.3	86.2
12. Submaxillary glands palpable at every examination	26	11	15	36.6	5 .
13. Supratrochlear glands palpable. No fluctuation noted	18	6	12	20.0	41.4
14. Posterior auricular (mastoid) palpated	6	....	6	.....	20.7

The above table contrasts the results obtained in the two races. Of this series of cases, thirty were white and twenty-nine black women. These groups are sufficiently large to permit of a comparison. In the negro women the lymphatic glands were larger in every region where they were palpable. There was no case among them in which some lymphatic glands could not be palpated at some time during the period of examination, although in the one case above reported no glands were palpable at several examinations. Progressive enlargement of the axillary glands was noted in (ten out of thirty-three) 30.3 per cent of the black and in (five out of twenty-nine) 17.3 per cent of the white women. Definite enlargement of the axillary glands with beginning lactation was noted in (five out of ten) 50 per cent of the white and in (nine out of twelve) 75 per cent of the black women. This result agrees very well with the well-known fact that the breasts of negro women are usually larger and more active than those of white women.

Since the axillary glands were found definitely enlarged at the beginning of lactation in 62.5 per cent of the twenty-two cases examined, a like percentage of all the cases would probably have shown a similar enlargement of the axillary glands, had they been examined on the third or fourth days after labor. This would be approximately thirty-seven cases, while a gradual progressive enlargement was noticed in but fifteen cases. According to the percentage estimates just given for the races, about fifteen of these thirty-seven cases would fall to the white race and twenty-two to the negro race.

The supratrochlear glands were palpated in (twelve of the twenty-nine) 41 per cent of the black and in (six of the thirty) 20 per cent of the white women. Granting that, even in this class of patients, lues is more prevalent in the black than in the white race, I doubt whether it is the only cause of this difference. It is not unlikely that the greater carelessness with which the negro race regard all affections may be an important factor in the observed enlargement of these glands. Their occupation and habits, too, are often such as to make infections more common. Besides, the greater prevalence of infectious diseases, especially tuberculosis, must be borne in mind.

The posterior auricular glands were palpated in (six of the twenty-nine) 20.7 per cent of the negro women, but never in a white woman. For this discrepancy, affections of the scalp are probably largely responsible.

In case of the submaxillary glands, there is a similar though less marked difference in favor of the white race. The influence of child-bearing upon the teeth may be the main factor in the elimination of this greater difference. Then, too, the tendency to omit all oral hygiene is but too common in these classes — both white and black. These glands were easily palpable in 63.3 per cent of the white and in 86.2 per cent of the black women. They were invariably firm, markedly enlarged, and subject to frequent fluctuation. These fluctuations were often ac-

companied or preceded by toothache or the existence of carious teeth, especially in the lower jaw. In fact, it was quite easy to diagnose the conditions of the teeth from an examination of these glands in the great majority of cases, even when no history of toothache was obtainable. The ingenious experiments of Korner Halle upon teeth of dogs easily explain these observations.

The small series of cases in which the inguinal glands were found enlarged scarcely justifies comparison. They were *palpable* in twenty-nine of the thirty white and in all of the twenty-nine black women.

A thorough search of the literature has failed to reveal a similar series of observations on the lymphatic glands in pregnancy. Nor was it possible to obtain any knowledge as to what may be considered the normal in the case of women of the ages examined. That the entire absence of palpable glands cannot be regarded as the normal in any but nullipara, seems indicated. For, unless we are willing to regard lactation as abnormal, we must admit that normal changes in the breasts — or pregnancy itself — may be the cause of temporary, or even permanent, palpability of the axillary lymphatic glands. Besides, we know that in the groin the sclerosis occurring with age may alone cause the lymphatic glands to become palpable through a change in texture of these glands. From the observations made on this series of cases I should regard palpability of the axillary and inguinal lymphatic glands as entirely normal in pregnant women. Such a condition does not necessarily presuppose the existence of any previous local lesions or general adenopathy, although it is manifestly impossible to exclude the manifold factors in the life of the individual which may have affected the lymphatic glands, to estimate the extent of this involvement, or to determine the changes it has produced by mere methods of palpation. As the normal cases do not terminate fatally, it is practically impossible to obtain material for microscopical study from human subjects. Studies on animals may, however, throw some light on these changes.

SUMMARY AND CONCLUSIONS

1. The axillary and inguinal lymphatic glands were found palpable in 98.3 per cent of all cases; the submaxillary in 74.6; the supratrochlear in 30.5; the posterior auricular in 10.1.

2. Progressive enlargement of the axillary lymphatic glands was noted in 25.4 per cent of all cases; of the inguinal, in 15.2 per cent. The enlargement of the submaxillary glands was often marked, occasionally transient, and invariably due to affections of the teeth, mouth, or throat. The suprahyoid lymphatic glands were palpated in one case only. No cause could be found.

3. A more or less marked enlargement of the axillary glands coincident with lactation was observed in 62.5 per cent of the cases examined approximately three days post-partum. No similar enlargement of the inguinal glands was observed, save in one case, in which there was a marked leucorrhœa.

4. No general enlargement of the lymphatic glands was observed.

5. The enlargement noticed in the axillary, inguinal, and submaxillary regions is thought to be largely, if not wholly, due to local causes, dependent, in the case of the axilla and the groin, upon pregnancy; in the case of the submaxillary region, upon affections of the teeth, gums, mouth, and throat.

6. In the negro women the glands were found larger, and oftener became enlarged. This is shown especially well in case of the axillary, submaxillary, supratrochlear, and posterior auricular glands.

These differences are thought to be due mainly to larger and better functionating breasts, and to greater neglect of the teeth in case of the axillary and submaxillary glands, respectively, and to the greater frequency of affections of the scalp in the negro race as regards the posterior auricular group.

7. Discrepancy in size between the glands on the right and left sides of the body were common in the submaxillary region, infrequent in the axilla, and rare in the groin. Fluctuations in size during the period of observation varied similarly, save that they were more frequent in the axilla after the onset of lactation. These fluctuations in size were often sudden and marked in case of the submaxillary and axillary glands, but always gradual and slight in case of the inguinal group.

8. No new formation of lymphatic glands was

observed, nor was any evidence obtained showing that the glands on the right side of the body are larger and oftener become enlarged than those on the left side.

BIBLIOGRAPHY

1. Albertin (de Lyon). Des adénites géniennes. (Adenites de Poucet.) Archives provinciales de Chirurgie, iv, 1895.
2. Bezancon et Labbé. Le Ganglion Lymphatique Normal, Anatomie et Physiologie. La Presse Medicale, 1891.
3. Cooper, Arthur. Remarks on Enlargement of the Inguinal Glands, Chiefly in Connection with the Diagnosis of Primary Syphilis. Lancet, 1901, pt. i, pp. 1075, 1076.
4. Cotton, F. J. Clinical Topography of Lymph-nodes. Boston Medical and Surgical Journal, 1904, vol. cli, pp. 229–234.
5. Jürgens, Erwin. Ueber die Bedentung der Lymphdrüsen in der Umgebung des Ohres. St. Petersburg Med. Wochenschr., N. F., Yahr. 18, 1901, bd. xxvi, No. 41, s. 455.
6. Labbé, M., et Bertin, G. Des réactions ganglionnaires chez les enfants. La Presse Medicale, 1902, i, pp. 99–102.
7. Labbé, Marcel. Etude du Ganglion Lymphatique dans les infections aigües. Thèse, 1898, Paris.
8. Morgan, G. Lymph, glands in Relation to the Teeth and Gums. British Dental Journal, 1903, vol. xxiv, No. 8, pp. 521–533.
9. Princeteau, M. Les ganglions lymphatiques de la joue. Bulletins de la Société d'Anatomie et de Physiologie Normale et Pathologique de Bordeaux, 1899, t. xx.
10. Retter, Edw. Sur la modifications que détermine l'abstinence dans les ganglions lymphatiques. Comptes Rendus de la Soc. de Biol., Paris, 1902, pp. 101–103.
11. Stiles, H. J. Contributions to the Surgical Anatomy of the Breast and Axillary Lymphatic Glands. Edinburgh Med Jour., 1892, vol. xxxvii, pp. 1099–1112; 1893, vol. xxxviii, pp. 26–42.
12. Vigier, P. Des Adénites de la Joue. Thèse 1892, Lyon.
13. Vigier, P. Gaz. hebd. de Med. et de Chir., 1892, t. xxix.
14. Zacharow, F. Zur Frage um die Veränderung der Lymphdrüsen in Greisen Alter. Dissert. St. Petersburg, 1891.

SYMPTOMATOLOGY AND DIAGNOSIS OF ACUTE PANCREATITIS

Based on a Review of One Hundred and Seven Cases With Report of One Case

By ANFIN EGDAHL, M. D.
Instructor in Pathology, State University of Iowa, Iowa City, Iowa

THE subject of this paper has been so thoroughly treated in the many articles on the pancreas published within the last few years, that all that can be done in this review is to emphasize certain points of particular interest. The well-known statement of Fitz, that "acute pancreatitis is to be suspected when a previously healthy person or a sufferer from occasional attacks of indigestion is suddenly seized with a violent pain in the epigastrium, followed by nausea and collapse, and in the course of twenty-four hours by a circumscribed epigastric swelling, tympanitic or resistant, with slight elevation of temperature," — still covers the main points in the diagnosis of typical cases of the disease. The only thing that might be added to this is the importance of gall-stone colic in the previous history, as shown by Opie. Glycosuria, lipuria, fat, and undigested muscle fibers and nuclei in the fæces, when present, are of great aid in making the diagnosis, but usually the diagnosis has to be made from the clinical manifestations only. Within the past few years, Cammidge of England has been working on a reaction for the glycerin supposed to be present in the urine of patients afflicted with pancreatic disease. This glycerin is derived from the fat split up through the action of steapsin. Cammidge has published some very good results, but his findings have not as yet been satisfactorily verified. However, the general consensus of opinion is, that it is worthy of further trial.

As Bloodgood has already stated, we may recognize clinically two different forms of acute pancreatitis; namely, acute hemorrhagic and

acute suppurative or pancreatic abscess. The first is characterized by exudate of serum and blood into the pancreas and peripancreatic tissues. There may be various degrees of necrosis, and there is usually present disseminated fat necrosis and intraperitoneal hemorrhagic exudate. In pancreatic abscess there is present one or more abscesses, and there is usually more or less gangrene of the pancreas. Pathologically, undoubtedly the latter variety passes through the hemorrhagic state. Considerable discussion has taken place as to whether the inflammation or the hemorrhage takes place first. Germain and Christian have published a report on an early case of acute pancreatitis in which there was present inflammation, but no hemorrhage.

Ninety-two out of the one hundred and seven cases serving as a basis for this paper were operated on or came to autopsy. Fourteen of them were correctly diagnosed, as shown by the later findings. The remaining fifteen cases were examined only as to symptoms, signs, and history, and consequently there will remain some doubt as to the correct diagnosis.

One of the most characteristic symptoms of onset is the pain. There is a striking similarity in the terms used by the different authors in describing this very characteristic phenomena. Expressions like "sudden severe epigastric pain," "acute, agonizing epigastric pain," "severe, excruciating abdominal pain," etc., occur in most of the histories. It may be well to remember that an abdominal pain, especially when located in the epigastrium, that does not yield to morphine is very likely to be of pancreatic origin. It is supposed by some to have its origin in the cœliac plexus. Kraft explains it on the basis of Lennander's findings on the sensibility of the peritoneum. That the pain may be atypical in some cases is perfectly possible; in fact, in one case of hemorrhagic pancreatitis following infarction there were no symptoms of abdominal disorders. An interesting relationship between the parotid gland and pancreas is shown by the eleven reported cases of acute pancreatitis associated with mumps, ten of which were reported by Simonin. However, none of these cases were operated on or came to autopsy, so the anatomical or pathological conditions present were not ascertained. The parotid gland, as is well known, may enlarge during a severe systemic infection without causing marked symptoms. Kraft believes the pancreas may do the same, and reports a case in which this occurred. In by far the great majority of cases, the onset is sudden. Out of ninety-six collected cases in which the symptoms of onset were carefully given, the onset was sudden in eighty-eight and gradual in eight. The ætiology of these cases varied; some were due to gall-stones, others to gastro-intestinal disorders.

The epigastric region is usually the seat of the most severe pain, but this is not always the case. Out of seventy-one cases in which careful physical examinations were made, forty-four gave the pain as epigastric or stated that it was most severe in this region. Seventeen called the pain abdominal, without stating specifically the region of greatest intensity. Of the remaining ten cases, in five the pain was most severe in the right hypochondrium; in two, in the umbilical region; one each in the lower abdomen, left abdominal region, and back.

The relation between right hypochondriac pain and pancreatitis is not always clear. It might be supposed that pancreatitis associated with gall-stones would be especially likely to have the pain originate or most severe in this region, but this seems not to be necessarily the case. Out of the five, two were associated with gall-stones, two with gastro-intestinal disorders, and one with typhoid fever. Kraft claims that at times the inflammation may extend through the foramen of Winslow and along the lower border of the liver and the transverse colon. This might explain right hypochondriac pain in some cases.

In nineteen there was a history of previous attacks that simulated pancreatitis. Seven of these were designated hepatic colic; ten were described as similar to present attack; two had had as many as three previous attacks. A large proportion of the remaining patients had had ill-defined attacks of epigastric and other abdominal pains and disturbances that may or may not have been of significance. A previous history of gall-stone colic is always of importance in the diagnosis of pancreatitis. It is more difficult to state the meaning of epigastric pain, nausea, and vomiting in those cases where

calculi can be excluded. The frequency with which connective-tissue proliferation and other evidences of irritation are found in the pancreas, especially in the head, points to the fact that this organ may be the subject of infections and irritations, aside from those produced by gall-stones, that may manifest themselves in epigastric pain, nausea, and vomiting. Some of them, without a doubt, may become fully defined cases of hemorrhagic and even suppurative pancreatitis, and yet recover.

It is now believed that pancreatitis is not the invariably fatal disease that it was formerly supposed to be; but that the death-rate is high, is very true. Timely operative intervention has saved the lives of many of the reported recoveries. Bloodgood gives the mortality in cases without abscess formation as 66 per cent. As this series of cases shows, there is a decided difference in the mortality-rate between the cases associated with gall-stone and those associated with gastro-intestinal disorders. In forty-four cases of pancreatitis supposed to have been caused by gall-stones, the mortality was sixty-eight per cent. In thirty-two cases supposed to have been caused by gastro-intestinal disorders, the mortality was 53 per cent. Why there should be this difference in death-rate, it is hard to say. Aside from the fact that in the first group the patients are usually suffering from two disease processes — chololithiasis and pancreatitis — it is possible that the bile salts may cause the difference. Flexner has shown that these salts exert an injurious action on pancreatic tissue when injected. If the bile is infected — which is very probable in cases of chololithiasis — there may be two agents at work causing tissue destruction of the pancreas in retrojection of bile, the bile salts, and bacteria. In cases where the infection follows gastro-intestinal disorders, the method of infection is obscure in a given case; but it must be through the intestinal wall, or ampulla of Vater, or through the blood stream and lymphatics. It is probable that tumefaction of the ampulla will cause retrojection, but I do not believe it is as likely to occur here as in chololithiasis.

Nausea and Vomiting. Next to the great pain comes the marked nausea and vomiting as the most prominent symptom. In only a very few cases did nausea exist alone. In the majority, nausea and vomiting was a very marked symptom, and a very distressing feature of the disease. This is one of the symptoms that has led many physicians to diagnose intestinal obstruction in cases of pancreatitis. The manner of vomiting and the character of the vomitus may be the same in the two conditions. In eighty-eight out of the one hundred and seven collected cases, nausea and vomiting was present. In the remaining, it may have occurred, but it is not mentioned.

Abdominal Distention. This is a marked feature, occurring in fifty-four out of the one hundred and seven cases. In the great majority coming to operation or autopsy, more or less fluid was found in the peritoneal cavity. Kraft believes the meteorism, in part, is due to the absence of pancreatic juice in the intestines. It has been found that this secretion has an inhibiting action on microtoxins and the growth of various bacteria. Where the pancreatic juice is absent, he believes the bacteria of putrefaction will develop unhindered.

Prostration and Collapse. This is another prominent symptom, occurring in a large number of cases. So extreme is the collapse and so rapid the onset in typical cases, that clinicians have been puzzled to explain its ætiology. Guleke says the absorption of the liberated trypsin is the cause, and supports his views by experimental proof. Doberauer produced collapse by injection of pancreatic material from cases of pancreatic necrosis. Their results have not yet been verified. Involvement of the cœliac plexus is supposed by many to bring about the condition. The extreme pain, it would seem, should be a sufficient cause, and if so, the stretching of the peritoneum, acting as a sensory irritation, might be considered an ætiological factor if Kraft's explanation is correct. The very early shock is a most characteristic feature of acute pancreatitis. Bloodgood speaks of a delirium that he has noticed in some cases of pancreatic abscess. This delirium may be much like that of typhoid fever.

Abdominal Tumor. Mention is made of tumor in twenty-eight out of one hundred and seven cases. I have no doubt that tumor was present in more patients than these, and that the abdominal pain and rigidity prevented

thorough palpation. The tumor varied from a slight induration to two or three well-defined tumors easily visible to the eye. In most of these, the tumor appeared as an easily discernible mass after the lapse of several days. In many of the early cases it was felt merely as an area of induration or as an ill-defined mass. This may have been due, as already stated, to abdominal rigidity. It is interesting to note that, out of seventeen complete histories, twelve gave as the diagnosis suppurative pancreatitis.

Jaundice was present in fourteen out of forty-four cases associated with gall-stones; and mention is made of jaundice in only seven out of seventy-two cases associated with other conditions than gall-stones.

Hiccup was present in six patients. Three of these were suppurative, two hemorrhagic, and one not stated. Four were in the gall-stone group, the other two in the gastro-intestinal group. It is probable that irritation of the diaphragm or its nerves is the cause.

Constipation is a far more frequent condition in all groups than diarrhœa. It is supposed that this is brought about by paralysis of the bowel.

Increased appetite and thirst was noted in two cases. One of them was associated with glycosuria and gall-stones. Complete recovery took place in this case.

There are a great number of minor symptoms given. Among these may be mentioned pruritus, retention of urine, polyuria, pain on micturition, painful breathing, chills and sweats — each in one case.

Glycosuria, lipuria, and fatty stools are very rare occurrences; but when they do occur, they are of great diagnostic importance. It has been noted by many, who have made a study of the pancreas, that, following ligation, section, or obstruction of the duct, atrophy of the glandular portion results, but the islands of Langerhans remain unaffected. These results, obtained by Vassali, Sobolew, Schulze, and others, have recently been verified by Dr. Lydia De Witt. It is possible that the islands of Langerhans might be more resistant to destructive influences than the glandular portion of the organ. However, as a rule, the head of the gland is the part most frequently involved, leaving the tail, which contains the greatest number of islands, unaffected, or disturbed to only a moderate degree. According to Von Noorden experimental pancuatic diabetes of a mild form results if about one-tenth of the pancuas is left in a functionating condition. Remove this, severe diabetes results.

In one case a fluoroscopic shadow was noted. Suspicious rose spots and a positive Widal reaction occurred in a patient reported by Scott, but typhoid was excluded at autopsy. Hanseman reports a similar case of pancreatitis, with rose spots simulating those of typhoid fever. It is probable that these rose spots may have been produced by areas of fat necrosis in the subcutaneous fat.

Temperature. The highest temperature reported in twenty-two cases, where temperature notes are given was 105.8° F. This was in a patient having suppurative pancreatitis secondary to boils. Four out of the twenty-two were normal; twelve were at 100° F. or over, only two reaching 103° F. Six were subnormal, the lowest being 96.2° F. From this it will be seen that high fever is not a characteristic of acute pancreatitis; in fact, a normal or subnormal temperature is almost as characteristic as pyrexia in uncomplicated cases.

Pregnancy. In one patient the pancreatic attack came on three months after confinement; in another, during the early months of pregnancy. This latter was an early case, with inflammation, but no hemorrhage. Peister states that toxæmia of pregnancy may produce pancreatitis, while Munzer believes cells from the placenta may become emboli, and in this way produce the disease.

Age and Sex. The average age of the patients in the gall-stone class was forty-one years; of those in which the pancreatitis followed gastrointestinal disorders, thirty-six years. The number of males was a trifle in excess of the number of females.

Fourteen of the one hundred and seven cases, as already stated, were correctly diagnosed before operation or autopsy. Nearly all of these were reported within the last four years. In thirty-six histories where the clinical diagnosis is stated, four were of intestinal obstruction; three, perforation following appendicitis; two, general peritonitis; two, gall-stones; two cholecystitis and perforation; two, gastric

ulcer; one each, abscess of liver, biliary colic or perforated gastric ulcer, appendicitis and gastric ulcer, appendicitis, perforative peritonitis or empyema of gall-bladder, typhoid inflammation of gall-bladder, obstruction and perforation, ruptured tubal pregnancy.

As will be seen from the above, there are a number of conditions which will simulate the onset and symptoms of pancreatitis. Intestinal obstruction is the disease that seems to simulate pancreatitis most closely, but, as a single pathological process, peritonitis, especially following perforation, takes the lead. Six of the twenty-two were diagnosed general peritonitis or perforation following gastric ulcer, gall-stones, appendicitis, etc., but were, at autopsy, found to be pancreatitis.

Types of Pancreatitis. Thirty-seven out of the one hundred and seven histories gave thorough autopsy notes. Seventeen described suppurative and twenty hemorrhagic conditions. It is interesting to note that ten of the suppurative cases presented tumors in the region of the pancreas, while only three of the hemorrhagic cases developed a tumor.

A sufficient number of counts are not on record to furnish a satisfactory basis for a comparison between the blood-changes in suppurative and hemorrhagic pancreatitis. The counts in the suppurative cases in this series show, what might be expected, a higher leucocyte count than the few counts in the hemorrhagic pancreatitis cases, and likewise, in general, a fewer number of red corpuscles. The temperature was, as a rule, about the same.

Judging from the preceding, the conclusion is justifiable, that, as soon as a tumor appears in the epigastrium in an attack of pancreatitis, with or without a leucocytosis, suppuration should be suspected. Out of fourteen cases of suppurative pancreatitis, there were five recoveries. These five all submitted to operation. Out of eighteen cases of hemorrhagic pancreatitis, only three recovered, and these underwent operation. This shows quite well that the prognosis improves if the patient survives the severe onset. Bloodgood's series shows eleven recoveries and twenty-four deaths after operation, with no recoveries without operation. At the Johns Hopkins Hospital there have been four cases of hemorrhagic pancreatitis with one recovery, and three of pancreatic abscess with two recoveries. Bloodgood states that most deaths occur within the first forty-eight hours.

I am indebted to Dr. Joseph Bloodgood, associate professor of surgery at Johns Hopkins Medical School, for permission to report the following case, seen at the Johns Hopkins Hospital.

Surg. No. 12675. White; male; aged 28 years; occupation, saloon-keeper.

Previous history negative, except for use of alcohol.

Onset. One hour after hearty supper, became nauseated, then vomited. Later, about one hour, intense pain, first in back, then in epigastrium, set in. Rolled on floor in agony. Pain and vomiting continued, also pain in shoulder-blades. At end of 24 hours, began to hiccup. Pain and vomiting grew gradually less; hiccup continued. No stool, no urine voided, during last 24 hours.

Examination. Acutely ill for 48 hours. Well nourished; looks very ill. Vomiting and hiccup almost incessant. No cyanosis of face. Face flushed; looks dull; tongue fairly clean and moist. Pulse rapid and weak, 110–120; leucocytes 18,000; temperature before operation not noted, after operation 103°. No bile or sugar in urine; slight trace of albumin, many pus-cells. Thorax negative. Abdomen uniformly and symmetrically distended. No cyanosis of skin, no dilatation of subcutaneous veins. Costal grooves obliterated; abdomen tense; no definite muscle spasm. In epigastrium, slight sense of greater resistance; more pain here. No movable dullness; percussion note tympanitic. Liver dullness not obliterated; edge of liver not felt. No mass felt. Distention of abdomen does not allow deep palpation. Conjunctiva slightly yellow; no cutaneous jaundice. Enema followed by first dark stool, then light stool. Peristaltic action not made out. No note on abdominal respiration.

Clinical Diagnosis. Intestinal obstruction or thrombosis of mesenteric vessels. Operation; died 24 hours after.

Autopsy. No stones in bladder or ducts; acute hemorrhagic pancreatitis in a pancreas apparently seat of chronic pancreatitis.

The points of particular interest in this case are, first, the sudden onset, with nausea and vomiting one hour after a meal, followed shortly after by intense pain, beginning in back, spreading to epigastrium. Pancreatitis starting with pain in the back is rare. In only one history in the one hundred and seven cases serving as a basis for this paper is backache mentioned as the beginning pain of pancreatitis. Other features of interest are, the hiccup, which is not at all rare in acute pancreatitis, slight jaundice, retention of urine, and absence of gallstones on careful examination before death and at autopsy.

This patient is another addition to the gastro-intestinal group of cases. Over half of the cases of this group give a history of alcoholism.

The evidence of chronic pancreatitis present in the head of the pancreas may have been brought about by an irritation from the biliary tract or intestines. It does not necessarily mean that gallstones had been present.

If we now combine into one clinical picture what the study of these cases shows, we have the following: Previous to the onset there is usually a history of cholecystitis, or some form of gastro-intestinal disorder, frequently alcoholic in origin. Occasionally the patient may have suffered from some other disorder, giving rise to the pancreatic disease, as typhoid fever, gastric ulcer, or he may have received an epigastric injury shortly before the attack.

The onset of the acute pancreatitis is characterized by sudden severe abdominal pain; in the majority, most severe in the epigastric region. This pain is of the most extreme character, at times not yielding to morphine. Nausea and vomiting set in almost at once; the vomitus at first consisting of food, later bile-stained and fæcal. The patient early shows signs of collapse. The temperature is normal, or only slightly elevated. The abdomen soon begins to show distention, but no real tumor is made out until 24–48 hours after onset. The epigastrium shows most distention, and after a few days a tumor may be palpable or even seen. Icterus, pruritus, cyanosis, hiccup, and other signs or symptoms may appear.

On examination, the following diseases will be thought of: Intestinal obstruction; appendicitis; perforation leading to peritonitis; thrombosis or embolism of the mesenteric vessels; and if a woman, ruptured tubal pregnancy. On careful examination it will be noticed that the process does not present the typical appearance of obstruction. The early collapse and shock, the intense epigastric pain and distention, and possibly an induration, or even an epigastric tumor, serve to rule out obstruction. If the patient has tenderness at McBurney's point, the history showing that the onset was with epigastric pain, combined with the finding of pain and induration in this region, will serve to rule out appendicitis. It should be remembered that if the inflammation spreads through the foramen of Winslow, it may reach the cæcum, and produce a pain in that region simulating appendicitis. Perforations may be very hard to exclude. This is especially true of perforating gastric ulcer. In this condition may be present epigastric pain, early collapse, and vomiting. A perforating ulcer situated on the posterior aspect is especially difficult to differentiate from the conditions in which pancreatitis has involved the saccus epiploiccus. If the perforating ulcer is anterior, the diagnosis may be more easy, according to Kraft. In this condition, the pain, on palpation, will be more superficial, while in pancreatitis a deeper pressure is necessary to localize the pain. If the inflammation spreads from the pancreas into the peritoneal cavity, the clinical picture, as a whole, will be that of peritonitis of any origin.

It is more easy to differentiate from thrombosis and embolism of the mesenteric arteries. This is a rare disease. As a rule, it does not have as sudden onset with the early local symptoms of pancreatitis. The pains may be anywhere in the abdominal region. There may be melenæ with diarrhœa, and there is frequently evidence of cardiac disease, while in pancreatitis there is sudden onset, with local symptoms and signs; as a rule, later, spreading, and presenting the picture of intoxication.

In ruptured tubal pregnancy there is usually the evidence of pregnancy; the pain is usually in lower abdomen, and the symptoms are those of hemorrhage, with marked decrease in hæmoglobin and red cells. A vaginal examination will reveal the hæmatocele.

If glycosuria, lipuria, fat, and undigested nuclei and muscle fibers appear in the stools, important evidence of pancreatic involvement is at hand.

BIBLIOGRAPHY

1. Atkinson. Jour. Amer. Med. Assoc., June 29, 1895.
2. Palkof. Berliner med. Woch., 1898.
3. Keyser. Lancet, Oct. 19, 1901.
4. Monks and Scannell. Boston Med. and Surg. Jour., Jan. 22, 1903.
5. Lund. Boston Med. and Surg. Jour., Nov. 29, 1900.
6. Hogarth and Moynihan. Practitioner, April, 1903.
7. Halsted. Johns Hopkins Hospital Bulletin, 1901.

8. New. Jour. Amer. Med. Assoc., Dec. 30, 1905.
9. Tuttle. Presbyterian Hospital Reports, New York, Jan., 1898.
10. Scott. American Journal of the Medical Sciences, Oct., 1899.
11. Mayo. Jour. Amer. Med. Assoc., Oct. 4, 1902.
12. Brown. Lancet, Sept. 26, 1903.
13. Batchelor. Medical News, Aug. 9, 1902.
14. Pearce. American Medicine, May 28, 1904.
15. Opie. American Journal of the Medical Sciences, Jan., 1901.
16. Wiener. New York Medical Journal, May 16, 1903.
17. Stockton and Williams. Philadelphia Medical Journal, Oct. 7, 1900.
18. Fison. Lancet, June 4, 1904.
19. Sappington. American Medicine, Nov. 5, 1904.
20. Ill. American Journal of Obstetrics, Nov., 1901.
21. Thayer. Johns Hopkins Hospital Bulletin, Nov., 1905.
22. Kraft. Hospitalstidende, Copenhagen, April 23, 1902.
23. Brennecke. Jour. Amer. Med. Assoc., June 4, 1898.
24. Thayer. American Journal of the Medical Sciences, Oct. 18, 1895.
25. Lando. St. Paul Medical Journal, Jan., 1903.
26. Porter. American Medicine, Aug. 13, 1904.
27. Taylor. Lancet, Oct. 17, 1903.
28. Mahomed. British Medical Journal, July 9, 1904.
29. Von Mikulicz, Radecke. Annals of Surgery, July, 1903.
30. Chaufford et Revaut. Archives de Medicine Experimental.
31. Moynihan. Lancet, June 6, 1903.
32. Jones. Lancet, Feb. 18, 1905.
33. Simonin. Bulletins et Memoirs de la Société Medicale des Hôpitaux de Paris, July 24, 1903.
34. Woolsey. Annals of Surgery, Nov., 1903.
35. Muspratt. British Medical Journal, Feb. 6, 1904.
36. Deaver and Muller. American Medicine, March 19, 1904.
37. Scudder. Boston Medical and Surgical Journal, Nov. 16, 1899.
38. Germain and Christian. Journal of the American Medical Association, Sept. 24, 1904.
39. Murray. Annals of Surgery, Oct., 1902.
40. Le Count. Jour. Amer. Med. Assoc., March 2, 1896.
41. Holroyde. British Medical Journal, April 11, 1903.
42. Deaver. American Journal of the Medical Sciences, Feb., 1903.
43. Manges. Philadelphia Medical Journal, April 1, 1899.
44. Tilton. Annals of Surgery, July, 1902.
45. Rasumowski. Archiv klin. Chir., 1899, bd. lix.
46. Langton. Lancet, Dec. 17, 1898.
47. Pels-Leusden. Deutsche Zeitschrift f. Chir., 1903, bd. lxx.
48. Brentano. Archiv f. klin. Chir., bd. lxi.
49. Swierzewski. Jahresberichte, 1899, bd. v.
50. Hahn. Deutsche Zeitschrift f. Chir., 1901.
51. Zeller. Centralblatt für Chir., 1901.
52. Bloodgood. International Clinics, April, 1904.
53. Beck. Jour. Amer. Med. Assoc., Nov. 2, 1901.
54. Boehm. Beiträge, 1904, bd. xliii.
55. Rantenburg. Mittheilungen a. d. Grenz. d. Med. und Chir., 1904, bd. xiv.
56. Koerte. Centralblatt für Chir., 1904, bd. xxxi.
57. Nobe. Archiv f. klin. Chir., 1905, bd. lxxv.
58. Hanley. Buffalo Med. Jour., Dec., 1904.
59. Wagner. Beiträge z. klin. Chir., 1900, bd. xxvi.
60. McPhedran. Montreal Med. Jour., 1896.
61. Bernhardt. Berliner klin. Wochenscrift, 1904.
62. Brentano. Centralblatt für Chir., 1899, bd. xxvi.
63. Gallaudet. Annals of Surg., 1899, vol. xxx.
64. Guinard. Bull. et Mem. de la Soc. de Chir. de Paris, t. xxx.
65. Marwedel. Münch. med. Wochenschrift, 1901.
66. Braun. Jahresberichte, 1900, vi.
67. Grawitz. Münch. med. Wochen., 1899.
68. Liebig. Jahresberichte, 1900, vi.
69. Freeman. Denver Medical Times, 1901.
70. Munzer. Centralblatt für der Grenzgebeite der Med. und Chir., 1903.
71. Guleke. Archiv f. klinischen Chirurgie, Langenbeck, Berlin, lxxviii, No. 4.
72. Doberauer. Beiträge z. klin. Chirurgie, von Bruns, Tübingen, xlviii, No. 2.
73. De Witt. Journal of Experimental Medicine, March, 1906.
74. Bloodgood. International Clinics, 1904.

DYSMENORRHŒA AS A SYMPTOM OF ABNORMAL PELVIC CONDITIONS

From the Gynecological Clinic of Dr. Howard A. Kelly, Johns Hopkins Hospital, Baltimore, Maryland

By GERRY R. HOLDEN, M. D., Jacksonville, Florida
Associate Gynecologist to St. Luke's Hospital, Jacksonville, Florida

WHATEVER may be the ultimate causes of dysmenorrhœa, the clinician can easily recognize two great classes: 1. The dysmenorrhœa occurring in patients whose pelvic organs are apparently normal; and 2. Dysmenorrhœa associated with and apparently caused by some gross abnormal condition of the pelvic organs.

Manifestly, the recognition of these two classes is of great importance. Of but little less moment is the possession of accurate and definite knowledge regarding the relative importance of the various abnormal conditions which may cause dysmenorrhœa. We should know what the conditions are which may act as a cause, and we should also know something about the relative frequency with which each condition may be found in this relationship.

The failure, after a careful search of the literature, to find satisfactory and clear answers to these questions impelled me to the following study of dysmenorrhœa as a symptom of abnormal pelvic conditions. The work was done during my service as resident gynecologist at the Johns Hopkins Hospital, and through the kindness of Dr. Howard A. Kelly I was able to utilize the histories of that department as the material for this study.

The histories of one thousand consecutive recent cases admitted to the gynecological wards were analyzed with reference to the occurrence of this symptom.

I have omitted all cases in which menstruation either had not begun or had ceased, also all rectal, kidney, and ureteral cases, as these are not, strictly speaking, gynecological, to which I have restricted my studies.

We must not consider dysmenorrhœa occurring in the presence of an abnormal condition of the pelvic organs as necessarily caused by that condition. To be so considered in a given case, we must show, either: 1. That, after the appearance of the condition, dysmenorrhœa occurred for the first time, or a previously existing dysmenorrhœa became worse; or 2. That a very large portion of all such cases are always accompanied by dysmenorrhœa. Obviously, to fulfill the first condition is difficult in many cases. Statements of patients concerning conditions which have existed for many years may not be accurate, or their answers may unintentionally be misleading.

If the condition be the result of injuries during labor or be due to pelvic inflammatory disease, then the onset can be fairly well determined. In myomata we can only conclude that if a woman, who previously had menstruated painlessly, gradually began to have dysmenorrhœa, and finally, on examination, a myoma is found, then there is a more or less direct relation between the two conditions. In other conditions in which it is difficult to say how long the abnormality has been present, i. e., retropositions in nulliparæ, ovarian tumors, etc., we are able to draw general conclusions by the frequent association or absence of dysmenorrhœa with the given condition.

The results of this analysis are tabulated below.

Col. 1 gives the number of cases in which there was no dysmenorrhœa.

Col. 2 gives cases in which dysmenorrhœa was present, apparently caused by an abnormal condition.

Col. 3 gives cases in which dysmenorrhœa was present, but not affected by an abnormal condition.

Col. 4 gives cases in which dysmenorrhœa was present, but in which it is not certain whether an abnormal condition had an effect upon it or not.

The first question which we may attempt to answer by study of this table can be put as follows:

What percentage of all gynecological patients suffer from dysmenorrhœa, and in what pro-

	Total Number of Cases	No Dysmenorrhœa	Dysmenorrhœa, Apparently Caused by Abnormal Condition	Dysmenorrhœa, not Affected by Abnormal Condition	Dysmenorrhœa, Effect of Abnormal Condition Doubtful
		Col. 1	Col. 2	Col. 3	Col. 4
"Dysmenorrhœa," pelvic organs normal	59	.....	.....	59	.....
Abscesses and cysts of Bartholin's gland	5	2	.....	3	.....
Lipoma of labium majus	1	.....	.....	1	.....
Angioma of vulva	1	.....	.....	1	.....
"Vaginismus"	1	1	.....	.....	.....
Vaginal cysts	1	1	.....	.....	.....
Atresia of vagina	2	.....	2	.....	.....
Carcinoma of vagina	3	2	.....	1	.....
Laceration of cervix	5	4	.....	1	.....
Cervical polyp	8	6	1	1	.....
Polypoid endometritis	7	5	.....	1	1
Intrauterine polyp	3	2	1	.....	.....
Retrodisplacements in nulliparæ	70	10	60	.....	.....
Retrodisplacements in multiparæ, without relaxed vaginal outlet	13	7	2	1	3
Retrodisplacements in multiparæ, with relaxed vaginal outlets	125	65	34	19	7
Relaxed vaginal outlet, alone	105	73	8	23	1
Complete prolapse	16	10	4	1	1
Pelvic inflammatory disease	270	122	85	62	1
Tuberculosis of uterus, tubes, or ovaries	19	11	2	3	3
Myoma	133	89	26	15	3
Malignant tumors of uterus	47	36	1	10	.....
Bicornuate uterus	1	.....	.....	.....	1
Ovarian tumors and cysts	71	53	3	13	2
Bladder and urethral cases	34	27	.....	7	.....
	1000	526	229	222	23

portion of them is it caused by abnormal conditions of the pelvic organs?

We find that 526 of these 1,000 patients, or 52.6 per cent, had no dysmenorrhœa, and 474, or 47.4 per cent, suffered from it. In 222 patients who had dysmenorrhœa, the symptom was apparently not caused by any abnormal pelvic condition. If we consider the dysmenorrhœa suffered by nulliparæ with retrodisplacements as caused by that condition, then we have 229 patients, or 22.9 per cent of the total number, suffering from dysmenorrhœa caused by abnormal pelvic conditions.

I wish next to consider the various conditions tabulated above with regard to the importance of each as a causative factor in dysmenorrhœa.

Most conditions affecting the external genitalia and vagina have apparently little effect, with the exception of atresia of the vagina, of which we have only two cases, and, to a lesser extent, relaxed vaginal outlet.

Under "Laceration of the Cervix" I have considered those cases in which the laceration was the only lesion. Cervical lacerations are usually associated with some other more important condition, and are tabulated here under the name of that condition.

Under "Polypoid Endometritis" are included a few cases in which this condition was found on microscopical examination of the uterine curettings. They were all cases of curettage for diagnosis, on account of uterine hemorrhage.

Our tables show no ætiological relationship between dysmenorrhœa and either cervical laceration or polypoid endometritis. Also, as would be expected, bladder and urethral troubles do not act as causes.

The other conditions tabulated are worthy of more detailed comment.

"Dysmenorrhœa," Pelvic Organs Normal. These are cases in which dysmenorrhœa was the chief or only complaint. The pelvic organs, on examination, were found to be normal, or else poorly developed in some few cases. This is the dysmenorrhœa which is often considered the result of mechanical obstruction, uterine neuroses, etc., and represents the first of the two great classes of dysmenorrhœa referred to in the opening paragraphs of this paper.

The proportion of such cases in hospital patients is naturally less than it would be in general gynecological work, for women are not so apt to enter a hospital for the relief of this trouble as they are for relief of more constant or severe suffering. There are 59 of these cases, giving us 5.9 per cent of the entire number in this class.

Retrodisplacement. We can only relatively obtain an estimate of the effect of retrodisplacement on dysmenorrhœa. Manifestly, in nulliparæ we cannot tell when the displacement first occurred. In many cases the history is that menstruation first became painful after one or more years of painless menstrual life. But the fact that, out of 70 nulliparæ with retrodisplacement, 60 had dysmenorrhœa points to a definite causal relationship between retrodisplacement and dysmenorrhœa. I have assumed

that the abnormal position is the cause of the symptom in these cases.

Retrodisplacement occurring after childbirth is much less frequently a factor, over one half of these cases having no dysmenorrhœa at all. As in most of these cases we have a definite date for the onset of the lesion, we can determine fairly accurately in what proportion dysmenorrhœa is a symptom of the displacement.

Our table shows us that out of 138 cases of retrodisplacement in multiparæ (including both those with relaxed vaginal outlet and those without it), 36 had dysmenorrhœa as a symptom, or 26 per cent of the 138 cases.

I will mention here three cases which are not included in the one thousand cases here analyzed, but which are worthy of mention because they show the direct effect of retrodisplacement.

They are Gyn. Nos. 9511, 2556, and 892, Johns Hopkins Hospital. The chief complaint of each on admission was dysmenorrhœa. Pelvic organs normal in each case. The cervix dilated and endometrium curetted in each. Dysmenorrhœa relieved for one, nine, and three years, respectively. Then it recurred in each patient, and each was readmitted to the hospital, and on examination the uterus was found to be in retrodisplacement. Suspension of the uterus with great relief of the symptoms in each case. Apparently, the return of the trouble was directly caused by the abnormal position of the uterus.

Dysmenorrhœa, then, is associated with retrodisplacement in a large number of cases as a symptom; much less frequently in the retrodisplacement occurring after labor than in that of the nulliparous woman.

Relaxed Vaginal Outlet. Under this heading are included all cases in which anterior or posterior colporrhaphy was done, and also all complete lacerations of the perineum. Descensus, to a greater or less degree, was associated with most of them, and lacerations of the cervix with many.

Here, again, the effect of retrodisplacement is shown. Out of 105 cases of relaxed vaginal outlet without retrodisplacement, but 8 (7.6 per cent of the 105 cases) had dysmenorrhœa; while, out of 125 cases in which the two conditions were associated, 34 (27 per cent of the 125 cases) had dysmenorrhœa.

Relaxed vaginal outlet alone, or associated with descensus, is to be considered a causal factor of dysmenorrhœa in a small number of cases. Retrodisplacement, which is often associated with it, is of much more importance.

Prolapse. This is certainly an infrequent cause in comparison with other conditions. The small number of cases in this table does not permit any general conclusions to be drawn.

Pelvic Inflammatory Disease. Under this heading are grouped all acute and chronic inflammatory diseases of the uterus, tubes, and ovaries, with the exception of tuberculosis. Endometritis, at the Johns Hopkins Hospital, is rarely seen, except in connection with inflammatory processes of other portions of the pelvic organs, and is not regarded as a clinical entity.

I have not attempted to distinguish between acute and chronic lesions. Such a classification would not be trustworthy. Many cases, apparently acute, are in reality acute exacerbations of chronic lesions. Neither have I attempted to discover any relation between the involvement of different organs and the occurrence of dysmenorrhœa. In most cases, uterus, tubes, and ovaries were all more or less involved.

From the table it will be seen that in 270 cases the inflammatory process caused dysmenorrhœa in 85, or 31 per cent of the 270 cases.

Tuberculosis of the Pelvic Organs. From the 19 cases it would appear that tuberculosis is not a frequent cause of dysmenorrhœa. The number of cases is too small, however, from which to draw any general conclusions.

Myoma. In 26, or 20 per cent of the 133 cases, dysmenorrhœa was apparently caused by the tumor. The different varieties of myoma were so frequently associated in the same case that it was impossible to determine accurately the relative importance of each variety. In general, however, it seems that submucous myomata are the most frequently associated, and subperitoneal the least.

Malignant Tumors of the Uterus. This includes cases of carcinoma of the cervix, fundus, and sarcoma. They have apparently little effect in causing dysmenorrhœa.

Ovarian Tumors. All solid and cystic tumors are included. Evidently there is little ætiological relationship. It is interesting to note, however, that four out of the five cases in which ovarian tumors might possibly cause dysmenorrhœa were cases of tumors with twisted pedicle.

Finally, I present Col. 2 of the foregoing table for study by itself. This column shows the number of times which each of the various abnormal conditions acted as causes of dysmenorrhœa in the series of one thousand cases.

Atresia of vagina	2
Cervical polyp	1
Intrauterine polyp	1
Retrodisplacement in nulliparæ	60
Retrodisplacement in multiparæ	36
Relaxed vaginal outlet	8
Prolapse of uterus (complete)	4
Pelvic inflammatory disease	85
Tuberculosis of pelvic organs	2
Myomata	26
Malignant tumors of uterus	1
Ovarian tumors	3
	229

In this table, three conditions stand out as great ætiological factors of dysmenorrhœa; namely, retrodisplacements of the uterus, pelvic inflammatory disease, and myomata. These three conditions themselves account for 207, or 89 per cent of the total 229 cases of dysmenorrhœa due to pelvic lesions. Retrodisplacements account for 96 cases, or 41 per cent of the 229 cases; pelvic inflammatory lesions for 85, or 37 per cent; and myomata for 26, or 11 per cent. In these one thousand cases, dysmenorrhœa due to other than these three conditions is rare.

The conclusions which I would draw must be understood as applicable only to this series of one thousand cases. While we must be careful in applying conclusions drawn from a small series of cases to all cases in general, yet I believe that these deductions have considerable value, and would be found correct, in the main, if compared with the results obtained from the study of a much larger series. They certainly have been of great value to me in the practical study of clinical cases.

CONCLUSIONS

1. Dysmenorrhœa is present in 47 per cent of all gynecological hospital patients.

2. In about 23 per cent of the entire number, it seems to be definitely caused by certain abnormal conditions of the pelvic organs.

3. In 22 per cent of the entire number, it is present in conjunction with such conditions, but is apparently not caused by them.

4. The pathological conditions which are most frequently seen as the causes of dysmenorrhœa are: 1. Retrodisplacements of the uterus; 2. Pelvic inflammatory disease; 3. Myomata. These three conditions account for nearly 90 per cent of all the dysmenorrhœa which is caused by pathological conditions of the pelvic organs. Retrodisplacement accounts for 41 per cent, pelvic inflammatory disease for 37 per cent, and myomata for 11 per cent.

5. Of nulliparous patients with retrodisplacements causing symptoms, 86 per cent have dysmenorrhœa. The frequency of association leads us to conclude that the abnormal position causes the dysmenorrhœa. In the retrodisplacements occurring after child-birth, it is much less common; 25 per cent of multiparæ with retrodisplacements have dysmenorrhœa, which is apparently caused by the malposition.

6. Of all the cases of pelvic inflammatory disease, 31 per cent have dysmenorrhœa which is apparently caused by the condition.

7. Of all the cases of myoma, 20 per cent have dysmenorrhœa apparently caused by the tumor.

VALVULAR DISEASE OF THE HEART COMPLICATING PREGNANCY AND LABOR

By FRANKLIN S. NEWELL, Boston, Massachusetts

ALTHOUGH a patient with a valvular lesion of the heart is necessarily looked upon as being in a more or less serious condition, which demands care and observation, no matter how perfect compensation may be at any given time, my experience in consultation practice has convinced me that a large part of the profession fails to recognize the importance of pregnancy and labor as complications of a previously recognized heart lesion. The obstetrician, particularly he who sees many patients in consultation, cannot fail to recognize the serious dangers which are attendant on pregnancy and labor in cardiac cases, and the medical consultant must also recognize the increased danger of failure of compensation when a damaged heart is subjected to a serious burden. The general practitioner, however, often fails to consider what the strain of pregnancy and labor must mean to the heart which is perhaps strained to its utmost to perform its normal amount of work, and is often surprised at the serious results which follow an easy labor, or the alarming complications which develop during an otherwise normal pregnancy. This attitude of mind is partly due to the fact that, to a large proportion of medical men, the complications of pregnancy and labor mean hemorrhage, eclampsia, and the dangers attendant on operative delivery, and that they do not take into account the strain, which is particularly marked in the circulatory system, imposed by the pregnant state.

All modern text-books on obstetrics discuss, more or less fully, the importance of the early recognition of cardiac lesions, of relieving the overworked heart when compensation begins to fail, and of terminating pregnancy or labor when any serious signs of failing compensation arise. The specialist in either obstetrics or cardiac disease recognizes the dangers, but the general practitioner often fails to give the cardiac lesion due consideration. Whether this is due to the general feeling that, parturition being a normal physiological function, even weakened organs should be able to accommodate themselves to a gradually imposed strain, or whether an underestimate is made of the degree of added strain which pregnancy throws on the heart, increased tremendously by the muscular exertion of labor, with its constantly changing blood-pressure, the fact remains that many cases of valvular disease of the heart are neglected, with serious and often fatal results. I do not mean to say that every case of valvular heart disease complicated by pregnancy is necessarily fatal, even if untreated, particularly in young women with a normal heart muscle, but I do believe that every case should create a feeling of anxiety in the mind of the attendant, and should receive the constant attention and watchfulness that a serious condition requires.

The fact should also be recognized, that certain lesions predispose in a greater degree to serious consequences than other lesions, and if any cases are to be neglected, those in which the neglect is likely to be attended with the least serious results should be selected. In a large series of cases, the occurrence of valvular lesion of the heart has been calculated as approximately two per cent of all cases.

The lesion which has been accompanied with the most serious consequences is unquestionably mitral stenosis, and various writers have gone so far as to claim that the discovery of a mitral stenosis is sufficient indication for the performance of abortion, although this seems to be an over-radical procedure in many cases. The next in importance are the lesions of the aortic valves, while uncomplicated mitral regurgitation is of distinctly less importance than the other lesions.

The importance of any lesion during pregnancy and labor depends on the power of the heart muscle to compensate for the extra burden. That an added burden is thrown on the heart during pregnancy is shown by the physiological hypertrophy which takes place during

the pregnant state, the heart accommodating itself to the new condition. It must follow, therefore, that a heart which has already been taxed to compensate for a valvular lesion may fail when an added burden is placed upon it, particularly a burden which is steadily increasing throughout the nine months of pregnancy; and even if this strain is withstood satisfactorily, the tremendous muscular exertion involved in all but the easiest labors must necessarily increase the danger to the patient to a very serious degree. The rules which must be followed in these cases, therefore, cannot be definitely laid down, and the degree of compensation in a given case must be taken as the guide for treatment; but as it would be considered unwise to advise a patient known to have an organic heart lesion to subject herself to severe muscular strain and exertion, the fact that the pregnant patient must necessarily undergo a serious strain should insure careful observation, and may be sufficient reason for urging most emphatically that the risks of pregnancy in the individual case are so great, as to be considered prohibitive.

The reports of the following three cases exemplify more perfectly the dangers liable to be met than is possible by any other method.

CASE 1. Multipara; sixth pregnancy; 6½ months pregnant. Patient entered the Boston Lying-In Hospital January 15, 1906, with the following history: Ten months previously, developed signs of failing compensation, cough, moderate dyspnœa, palpitation, some œdema of the extremities. Symptoms remained practically stationary until pregnancy began; since that time, symptoms progressively worse. Patient has been bedridden for six weeks before entering the hospital. During the last ten months, has been under the charge of eight different physicians. Examination at entrance showed slight, anæmic woman, in poor condition. Respiration rapid and labored. Moderate œdema of the lungs; marked œdema of the extremities and of the abdominal wall. Heart much enlarged. Diffuse pulsation over the apex region. Heart-rate, 140. Rate in radial arteries, 112. Loud systolic murmur heard over entire chest. Uterus enlarged about three finger-breadths above umbilicus, containing a small child. Some free fluid in the abdominal cavity. Condition such that immediate operation seemed necessarily fatal, and slight delay, with attempt to improve condition of the heart by absolute rest and heart stimulation, seemed advisable. At the end of twenty-four hours, condition seemed slightly improved. Heart-rate, 140; wrist pulse, 125. Breathing seemed rather less labored, and patient felt rather more comfortable, but had been able to retain very little nourishment, and had slept only three hours, under morphia. After twenty-four hours' further delay, patient decidedly worse, and immediate delivery seemed to offer the only chance. Seen by Dr. W. H. Smith in consultation, who agreed in indications. *Diagnosis:* Dilatation of the heart, with mitral regurgitation, and probably a primary mitral stenosis. *Operation:* Ether; easy manual dilatation and version. Patient collapsed, and died before completion of operation. Time of operation, sixteen minutes. Small, living child, 2½ pounds, which died in a few hours.

This case illustrates the dangers of pregnancy as a complication when compensation has already begun to fail before the advent of pregnancy. During the 6½ months of pregnancy the patient was under the charge of eight different physicians, all of whom attempted to restore the broken compensation, but missed the main indication, that the heart must be relieved of all unnecessary work by the termination of pregnancy before a reasonable hope could be entertained of its being restored to a satisfactory condition. This, in itself, shows how common the lack of appreciation is among medical men that pregnancy is a serious matter when the heart shows organic disease. If an abortion had been performed in the early months of pregnancy, there is every reason to believe that the patient would have survived the operation, and that although perfect health could never be restored, several months or years of comparative comfort might have been secured for the patient, by meeting the indications promptly. It was not until the patient was practically moribund, however, that the question of ending pregnancy on the chance of saving her life seems to have been seriously considered, and then it was too late.

CASE 2. Primipara; 25 years old. Seen in consultation. The following history obtained from the attending physician: Seen first when about six months pregnant, with marked signs of failing compensation. Rapid pulse; rate 140. Heart distinctly enlarged. Marked dyspnœa and slight pulmonary œdema. A presystolic murmur with marked thrill heard over apex. Slight cyanosis. Under rest, digitalis, and strychnia, compensation was re-established, pulse dropping to about 100, and, except for moderate dyspnœa, the patient went through the remainder of her pregnancy comfortably. Labor began at 4 A.M., June 22d, and, except for slightly increased dyspnœa, patient went through the first stage of labor with comparative comfort, cervix being fully dilated at 4 P.M. During the next three hours the perineum softened to a moderate

degree, but comparatively little progress was made in the face of a good labor. At 7 P. M., patient collapsed, became cyanotic, unable to lie down, and œdema of the lungs rapidly developed. Stimulated freely, but with little apparent effect. When I saw her first at 8:30 P. M., the patient was markedly cyanotic, gasping for breath, unable to lie down. The œdema of the lungs was easily appreciated on entering the room, without the aid of the stethoscope. Heart-rate, 160. Pulse poor, but approximately the same rate. Uterus contracting at five-minute intervals, but apparently accomplishing nothing. Head presentation, O. L. A. Head on perineum. Immediate delivery with low forceps accomplished without ether. Moderate bleeding after delivery, with marked relief. Patient reacted rapidly after operation, and one hour later was in fair condition. Cyanosis gone. Pulmonary œdema much diminished; pulse fair in quantity; rate 110. Moderate stimulation with nitroglycerine and strychnia advised, with the free use of morphia to rest the heart as much as possible. Convalescence uneventful. The patient made a perfectly satisfactory recovery.

In this case we have an example of a patient whose compensation began to fail in the middle of pregnancy, but was restored by rest and proper treatment to the point where the heart could carry on, not only its normal amount of work, but also endure the strain of pregnancy. The indications in this case seem to me absolutely definite, to shorten labor as much as possible without risk of doing serious damage, and thus lessen the strain to which the damaged heart was subjected. If this policy had been pursued, there seems to be little question but that the breakdown which occurred might have been prevented. In looking over the history, we see that the patient was allowed to go into the first stage of labor for twelve hours, and was then subjected to a three-hour second stage in the absence of definite progress. The only reason assigned for not interfering earlier was that there seemed to be no definite indication, as the patient was comfortable and apparently doing well, and there was apprehension as to the effect of ether on the heart. In the light of what happened, it can be readily seen that the strain of labor was too great for the heart, and any intervention, no matter how radical, would have been preferable to the strain that was permitted. The use of ether would have carried little or no added danger.

CASE 3. Primipara; 35 years old. Previous history, severe attack of rheumatism, with the resulting endocarditis, which had caused permanent aortic insufficiency, for which she had been under treatment before and during pregnancy. Had passed through pregnancy with comparative comfort; a slight tendency to dyspnœa, though little more than is seen in normally pregnant patients, and a somewhat extreme œdema of the feet, being the only indications of cardiac insufficiency. The patient was seen in consultation after forty-eight hours of moderate labor. The pains had been controlled with the free use of morphia from the beginning of labor, lessening the patient's suffering and masking her condition, but otherwise not affecting the labor. Patient well developed and nourished. Examination showed marked enlargement of the heart, and a loud systolic murmur over the aortic region. Heart-rate, 125. Beats transmitted to the wrist without change. Radial pulse, poor. Abdominal palpation showed a rigid uterus closely contracted around the child, with a contraction ring palpable at the level of the child's neck. Fœtal heart, 160. Vaginal examination showed a thinned out lower segment, and a wire-edged os dilated about one-half inch. Cervix applied tightly over child's head. Fœtal position O. D. P. Head fairly well engaged. *Operation:* Under ether, cervix dilated manually, with a moderate degree of laceration. Manual rotation of occiput, and extraction with forceps. A living child delivered, which died after five or six hours. The mother was in a state of collapse at the end of the operation; reacted fairly well to the use of stimulants, but four or five hours later collapsed again, and died. No hemorrhage.

In this case we have an example of a heart lesion so well compensated as to allow the patient to go through pregnancy without marked discomfort, and in all probability to endure a normal labor. It is natural, however, that a damaged heart subjected to the strain of a labor forty-eight hours in length, involving a degree of physical strain and exhaustion which would be apt to have serious results in a patient in perfect health, should fail under the strain to which it was subjected. The condition of the patient at the time of operation rendered delivery imperative, but if the operation had been undertaken twenty-four or thirty-six hours earlier, the patient would undoubtedly have been saved.

CONCLUSIONS

From these cases it is safe to conclude: 1. That any organic heart lesion, even if perfectly compensated under normal conditions of life, should arouse apprehension and call for constant watchfulness if pregnancy supervenes; 2. That in case pregnancy comes as a complication when the heart lesion is imperfectly compensated, the indication is for immediate relief by emptying the uterus, since a

heart which is not able to care for its ordinary work has no chance of supporting the added burden of pregnancy; 3. When a previously well-compensated heart fails under the extra work thrown on it by pregnancy, an attempt may be made to restore compensation by rest and appropriate treatment, but, unless these measures are promptly successful, the heart must be relieved by the removal of the extra burden; 4. In any case in which an organic heart lesion can be demonstrated, even though it may have caused no symptoms during pregnancy, labor should be regarded with apprehension, and every means should be taken to shorten the strain of labor, and thus relieve the heart of its extra burden, although it may seem to be doing its work satisfactorily.

Experience has repeatedly demonstrated that a patient with an organic heart lesion will stand operation perfectly well, if the operation is performed at a time previous to the acute dilatation which so commonly complicates heart cases when subjected to a prolonged strain. On the other hand, patients who are subjected to operation after dilatation has ensued as a result of the strain of prolonged labor not infrequently succumb to the strain of an operation which at an earlier period would have been borne without serious symptoms.

STRICTURE OF THE URETHRA IN MALE CHILDREN

With Report of a Case

By VICTOR F. MARSHALL, B. S., M. D., and EDWARD QUICK, M. D.,
Surgeons to St. Elizabeth's Hospital, Appleton, Wisconsin

ABOUT a year ago, E. B., aged 8, came under our care, with the history of having passed "bloody" urine for a day, and of having difficulty in urination. Upon examination, the abdomen was found to be prominent, dullness extending from the pubis to the umbilicus and some distance on either side. No rise of temperature. On having him urinate, the stream was seen to be markedly diminished in volume and with no force. He expelled the urine with considerable difficulty and distress. Upon sounding him for stone in the bladder, the result was negative. However, it was found that an obstruction existed in the membranous urethra, which allowed a No. 11 French sound to pass with difficulty. A catheter of suitable size was now passed, and 18 ounces of bloody urine was removed. Microscopic examination of the urine showed many squamous epithelial cells, red blood-cells, and polynuclear leucocytes. Stricture of the deep urethra was diagnosed. Owing to the great dilatation of the bladder-walls and their infection, we advised suprapubic drainage of the bladder and dilatation of the stricture under anæsthesia. The interference was consented to by the parents, and was carried out the following day. Suprapubic cystotomy was performed and the bladder drained by means of rubber tube. The stricture was of a yielding nature, and was gradually dilated to French No. 20. Inspection of the bladder-walls showed slight hyperæmia. The walls were considerably thickened. Neither polypi nor calculi were found. Soundings were continued at weekly intervals, and daily irrigation with a mild antiseptic solution. After drainage had been established for some four weeks, with a decided improvement in the patient's condition, the tube was removed to permit the wound to close. Next day, however, symptoms of an acute cystitis presented, of a pronounced character, with decided elevation of temperature and pulse, which yielded upon the reintroduction of suprapubic drainage and irrigation to bladder. Two weeks later, the tube was again removed and the fistulous opening permitted to close. The patient was closely watched by his nurse, and called upon to void the urine every two hours. This was deemed advisable, as the amount of urine excreted in twenty-four hours was double that of a normal child of like age. Convalescence progressed favorably, the urine being passed in a good stream, with the exception that it would stop and require one or two efforts to empty the bladder entirely. This condition appeared to be due to the child's nervous condition and to insufficient time taken in evacuating the bladder. Soundings were made every two weeks, and afterwards at monthly periods for some months, and no difficulty encountered in the passage of instruments. Upon a recent examination of the patient, the urine was found to pass in a full stream, with no discomfort whatever, and the bladder completely emptied by taking time. The bladder had contracted now to a capacity of twelve ounces. A careful anamnesis throws no light on the ætiology of the condition. The patient is one of three children of a consanguineous marriage. He is undersized and almost dwarflike. It is learned that the feeding in infancy was a difficult matter, and that he has always been subject to frequent attacks of

gastro-enteritis, acute colds, and bronchitis. Two years ago, adenoids and enlarged tonsils were removed under anæsthesia. Nervous, osseous, and lymphatic system negative. There is no history of a blenorrhagic discharge. The patient was circumcised in infancy, and there has been no balanitis, nor has there been any urinary trouble until the present condition.

How shall we account for the urinary obstruction in this case? We are not able to formulate a reasonable hypothesis. Of course, it is well known that gonorrhœa is the most common cause of urethral stricture in children. The disease is acquired from vicious persons in whose care the children are placed. One of us saw an epidemic of gonorrhœal urethritis in a large charity hospital a few years ago, in which forty or fifty male and female children were infected. But it does not seem possible that the case forming the subject of this report could have a gonorrhœal ætiology. It is hardly likely that this disease, with its subjective and local symptoms, could escape the notice of a careful mother. A congenital stricture is quite as unlikely, because the child had no difficulty until the eighth year. There is no history of trauma.

Dr. Poynter (1) reports a case of a boy, three years old, who was infected with gonorrhœa by a vicious girl (colored) nurse, 16 years of age. Two years later the child had stricture, which was treated with dilators.

Dr. Abbe (2) reported a case of four strictures of the urethra (three in the penile and one in the membranous), requiring external and internal urethrotomy, in a boy three years of age, who had previously been under Dr. Bangs's care for gonorrhœa acquired from a vicious girl.

Dr. McMunn (3) reports a case of a child, aged five years, who had had, at two years of age, a thick, yellow urethral discharge, lasting ten months. Close questioning failed to elicit a positive cause of the urethritis, but the mother said that the child's nurse had suffered from a yellow discharge at the time. She was sure there was no traumatism. The urethritis was, of course, the cause of the stricture, for symptoms of the affection had existed for three years. There was extreme difficulty in urination, and the urine was constantly dribbling away. A No. 4 millimeter bougie was firmly obstructed and held at the commencement of the deep urethra. The meatus was ample and the urethra not sensitive. The stricture was very rebellious to dilatation, but as treatment progressed a conditional cure was attained by means of tapering metal instruments.

In Northup's American edition of Ashby and Wright's *Diseases of Children* there is reported a case of a boy, four years of age, who had always been well previously, who complained of pain in the penis and hypeogastrium, and had dysuria and a discharge from the urethra. The edges of the meatus were glued together, and acted like a valve to cause retention of urine. The meatus was incised, the child catheterized and relieved. No opinion was expressed as to the cause of the discharge in this case.

Another boy, five years of age, with a history of discharge for three years, supposed to be gonorrhœa, though no microscopical examination is mentioned, is also reported by the same authors. Both cases are looked upon by the reporters as congenital meatus stenosis, but, in view of the presence of urethral discharge, especially its long duration, it would have been well to examine the remainder of the urethra.

A boy of six years of age, together with an eight-year-old brother, were reported by a Dr. Himowitch (4) as cases of probable gonorrhœa.

Fleming (5) reports two cases of impermeable stricture in boys of 3 and 5 years, respectively, with signs of extravasation into the penis and scrotum. He could give no cause, but suggested that the stricture might have been due to a minute angular calculus which had escaped detection. He reported another case of a child, seven years of age, who for two years had had an uneasiness in micturition, a tense, turgid penis, and who suffered great agony. There was no hæmaturia. He gives no cause, but concludes, after a very interesting consideration of the facts, that it was "strumous."

King (6) reports a case of a child who suffered from early infancy from stricture of the urethra, and who was cured by operation.

The case of a boy of 17 is reported who had gonorrhœa at eleven years of age, and who had a stricture in the bulbous urethra of No. 18 French (7).

The case of a boy of 11, with stricture of the urethra, of doubtful ætiology, is reported by Bokai (8). This child had had a bad urethritis

a year before, followed by symptoms of general syphilis.

A case reported by Gärtner (9). A boy, six years of age, with a stricture of the urethra (location and measurements not given). The dysuria was relieved temporarily by drugs, and relapsing, was treated by catheter. There was hemorrhage and complete retention. External urethrotomy was performed, and the boy recovered, with cystitis.

Case reported by E. Desnos (10), in a boy of 11 years. Cause not stated, but apparently gonorrhœal. No particulars given.

Dr. J. W. Thompson (11) mentions the case of a boy of 14 years with an organic stricture, due, in his opinion, to masturbation.

S. W. Gross (12) mentions a number of cases; one that of a boy of 13, an epileptic, with a stricture of No. 17 F., at 6½ inches from meatus.

In Samuels's *Texas Medical Journal*, March, 1887, a case is reported of a boy, 10 years of age, with a history of "spraying" and a small stream since birth. Cystitis was present, and he had three strictures, one posteriorly. The strictures were incised and dilated.

Bangs (13) reports two cases.

I. Boy, three years and five months old, who, two years previously, had an attack of diarrhœa, after which he developed constant pain in region of the bladder, and on attempting to pass urine found he could pass only a dram or two in spurts. Great frequency of urination. Exacerbation every two weeks. Mucus and pus in urine. Bladder held 20 ounces. Upon exploration, found stricture of No. 14 F., just within the meatus. This was incised, and on inserting the next size bougie a boule, No. 15 F., it was distinctly obstructed by two stricture bands, one 1¼ inches and the other 2 inches from the meatus. Treated by dilatation, as stricture was soft and yielding. Reports later were favorable.

II. An intelligent lad of 15 years, who for some years had trouble urinating — "scalding" and pain. When 13 years of age, had an attack of complete retention of urine. For its relief was given ether, and catheter passed. Necessary to repeat each day for week. In second week, done every third day. Was circumcised for long foreskin. After that he was etherized and catheterized "a couple of times." Then was given some internal medication, and finally got so he could urinate with but little pain. Following catheterization he had a discharge from his urethra, which was described as greenish white, and which stained clothing yellow. Discharge persisted year and a half, when a doctor prescribed an injection for him, which was used twice a week, with the result that the discharge ceased, and he found himself able to urinate with more comfort. If he had what was called "a cold," he immediately had a return of the difficult and painful urination. At times he had a watery discharge from the urethra. Upon being anæsthetized, the first stricture, a short distance within meatus, was divided to No. 26 F., and then three distinct tough fibrous bands of No. 12 F. were found between the meatus and a point 2¾ inches from the latter. Bands were divided by urethrotome until No. 26 F. bougie could be passed easily. Later reports favorable. No history of infection, no history of balanoposthitis, could be obtained, but as these strictures were firm and fibrous, such as follow urethritis in adults, perhaps ætiological factor forgotten, and that, in all probability, related to prepuce. Urethral discharge no doubt due to infection from repeated catheterization.

CONCLUSIONS

We believe cases of stricture of the urethra in male children are sufficiently rare to warrant the report of them from time to time. The general practitioner must keep the condition in mind in all genito-urinary disturbances in children. Gonorrhœa is undoubtedly the most frequent cause of the stricture. In this case, and in others cited, it is hard to believe in the gonorrhœal ætiology. Stricture may come from a simple pus infection of the urethra, being excited by a balanoposthitis.

Operation of some sort is always indicated, either dilatation, or internal or external urethrotomy. Usually, simple dilatation will suffice. Where bladder infection is of long standing, cystotomy, with radical treatment of the stricture, is the quickest and surest means of establishing a normal genito-urinary tract.

BIBLIOGRAPHY

1. Poynter. New York Med. Rec., Nov. 14, 1885.
2. Abbe. New York Med. Jour., Dec. 20, 1890.
3. McMunn. Brit. Med. Jour., 1894.
4. Himowitch. New York Med. Rec., Nov. 25, 1893.
5. Fleming. Dublin Hospital Gaz., 1855, vol. ii, pp. 67–69.
6. King. Monthly Jour. of the Med. Sci., London, 1853.
7. Archiv für Dermatologie und Syphilis, 1893, h, I u. II.
8. Bokai. Gerhardt's Kinderkrankheiten, bd. iv, abt. 3, s. 186.
9. Gärtner. Med. Corr.-blatt der Würtemberg. Aerzte, 1892, p. 132.
10. Desnos, E. Annales des Maladies des organes Génito-urinares, 1891.
11. Thompson, J. W. Louisville Med. News, 1897, No. 7, p. 137.
12. Gross, S. W. Diseases of the Male Sexual Organs.
13. Bangs, L. Bolton. New York Med. Rec., April 10, 1897.

PERINEAL LACERATIONS

A Study of the Remote Causes

By FRANK HINCHEY, M. D., St. Louis, Missouri

THE subject of the lacerated perineum is of undoubted importance, when we consider how very often this injury occurs in labor and the great suffering that is induced when the torn parts have not been properly repaired. The fact that such injuries rarely occur in parturition of the lower animals when the presentation is normal, or when there is no gross abnormality of the fœtus from improper crossing of breeds, causes us to consider in what particular the human animal is defective, that a normal act should be productive of such pathologic changes.

In my paper I shall confine myself to normal vertex presentations and normal pelves of primiparæ.

FREQUENCY OF LACERATIONS

The percentage of labors in which tears occur in all presentations is given by various authorities, in figures ranging from 21 to 35, as quoted by Williams (1), who regards these figures as too conservative, and who believes that from 50 to 65 per cent of all primiparæ suffer laceration to some degree. We may well agree with him when we consider that the figures quoted refer to labors in hospitals, where every resource of the obstetric art is directed to the prevention of such accidents. Knowing the proportion of normal presentations at the pelvic outlet from these same authorities, we readily figure that at least 19 to 32 per cent of these normal cases suffer laceration according to the conservative estimate, and from 45 to 58 per cent according to the estimate of Williams, of Johns Hopkins Hospital.

CAUSES OF LACERATIONS

In my study of the literature of this subject, I have not been able to find what seemed to me a sufficiently specific cause for dystocia due to resistance or rigidity of the pelvic floor, where the uterine contractions were normal. The literature of the female perineum — its anatomy, physiology, injuries and their treatment — is indeed enormous. But I have found only scant reference to the subject-matter I wish to discuss; so that what one might term the real ætiology seems to have been ignored. Writers commonly ascribe such dystocia to lack of proper development of the abdominal muscles, the result of our civilization. But we find the same difficulty in young women of very athletic physique. Indeed, such women often suffer excessively, for the perineal muscles share in the general muscular development, and refuse to stretch as readily as those in women whose muscles are more flaccid. So that I believe the solution of the problem must be sought elsewhere.

The performance of every physiological act is attained without injury, unless some abnormality or some defect interferes with such action. Normal labor is a physiological act. Therefore, injury sustained in such labor must be ascribed to an abnormality or a defect — an abnormality in a head too large, and a defect in a perineum too resisting. It will be my object to attempt to show that man's development has produced the abnormality and the defect. We are wont to consider nature as always adaptive, quickly compensating abnormalities, removing defects. Why, then, have we the head too large or the perineum too resisting? Why has nature been forced to permit the second stage of labor to be attended with pathological changes in man, in a large percentage of cases, despite the most skillful care, while in the lower animals (in normal cases) no aid is ever necessary and no tears occur (2). The difficulties seem insuperable by nature at the present stage of man's development.

In ascribing all tears in normal presentation to either an abnormality or a defect, I have considered the tears produced by too rapid expulsion as incidental to resistance of the perineum, for obvious reasons. Cases in which the occiput is prevented from engaging properly under the pubic arch, in consequence of the presence

of a pelvis approaching the male type, I ascribe to disproportion between the head and outlet. Tears produced by the shoulders, when we think the head has not been the offending part, are, of course, due to the same abnormality or disproportion.

DISPROPORTION OF THE HEAD TO THE OUTLET

The answer to the query, "Why do we find a comparatively large head in a comparatively small pelvic outlet?" is obvious to all. It requires no great power of observation to note that the heads of some are larger than those of others. An attempt to account for this would lead us beyond our subject, and we might dispense with further comment on disproportion, were it not for the fact that writers on labor in primitive people (Englemann and others) convey the impression that normal labor among them is not attended with the same difficulties, in most cases, as obtain with the civilized races; and when severe dystocia occurs, it is in labors following mixed union of a lower with a higher race. This would imply that nature has developed a pelvic outlet suited to an easy delivery of the fixed type of head prevailing among the tribe, and further, that this fixed type corresponds with the standard of physical development which is attained by the elimination of those below the average, by disease, violence, or primitive habits of sexual selection; in other words, that primitive people do not vary. This idea is entirely wrong, for no fixed type of brain or physique is permissible, since it is the fundamental law of nature to vary in reproduction, and the fact that nature does vary forms the keystone in the entire structure of evolution — really makes progressive development possible. So that while we have, in the higher race, brain capacities varying from 1,850 to 1,150 c.c. (3), we also find in primitive Australians a range of 1,500 to 930 c.c. (4), and in the Veddah of Ceylon, a range of 1,250 to 900 c.c. In these figures alone we have enough reason for belief that these primitive people must suffer from this cause of disproportionate head, even in unmixed unions; and if my belief of the causation of the rigid perineum is correct, they also suffer from that factor. But, among these people, there is, no doubt, an approach to a standard size of head, because they have no art for delivery of the large heads. A study of the observations of competent writers dispels the idea that they do not have many difficult labors, for numerous customs are described by which they endeavor to effect delivery. Disproportionate heads occurring in the union of couples having heads of small or below average capacity are due to transmission of ancestral characters; for we know by Galton's *Law of Inheritance* (5) and Galton's *Natural Inheritance* that the parents contribute but one half of the heritage, the grandparents one fourth, and thus, in decreasing proportions, all ancestors share in the perpetuation of characteristics. The cause of this reversion is well shown, I believe, in Brooks's *Law of Heredity*, being a modification of Darwin's gemmule theory. It appears to me, then, that disproportion of the head to outlet is due to the great range of variation in the size of man's skull (and body), both in primitive and in civilized races; that this great variation attains because the laws which govern the advance of all species in nature are not permited to obtain in mankind; that is, by reason of a great modification or subversion of the laws of the struggle for existence and of sexual selection. We can readily see from a comparison with the lower animals how these laws, if applied to man, would result in the development of a pelvic outlet advancing in harmony with the slight variation in size of the skull and body which would be permitted to obtain. In accordance with these laws, those below the standard of physique must be eliminated; so that in the absence of a great range in variation, this disproportion could not exist.

RESISTANCE OF THE PERINEUM

In discussing the ætiology of the resistance of the perineum, we will: 1. Review from the facts of man's developmental stage the effect upon the perineal structures in acquiring the upright gait; and 2. Try to show that these perineal changes have produced far-reaching effects — effects resulting in the eventual contraction of the pelvic outlet, especially its posterior area, with the loss of the tail as a consequence.

The center of gravity of a quadruped falls between the front and the hind legs; in man it falls near the spinal column. So, as Wieder-

scheim (6) has emphasized, we find in the former a greater number of ribs (eighteen in the horse) to protect and give support to the pressure of viscera in the ventral region. In man, the pressure is caudad, and the diminished ventral tension causes a lessening in number and size of the sternal or true ribs; and the vertebral ends of the false ribs are firmly attached, and the transverse processes of the lumbar vertebræ are well developed, to afford stability for the large muscles, which, anteriorly, aid in supporting the abdominal viscera, and, posteriorly, aid in supporting the body axially. It is interesting to note that in such animals as assume an upright posture occasionally, or which suspend the body by the arms in locomotion, we find thirteen or fourteen ribs normally (i. e., the anthropoid apes). In the human embryo, in accord with the well-known "biogenetic law," we find reduced ribs, in connection with all the lumbar vertebræ, and even in the sacral region (6). To relieve the lumbar region of a part of this abdominal weight, the ilii broaden out, forming in man the false pelvis. This broadening is greatest in the higher races, excelling the lower as they, in turn, excel the higher apes. Again, in the infant, where the ilii retain the shape common to the lowest races, we find that the pendulous abdomen is mainly supported by the muscles ultimately attached to the lumbar vertebræ. Further, the pelvic viscera require support, for the erect position sends them from the abdominal cavity; and here comparisons with quadrupeds cease. Nature is called upon to supply for the highest mammal a support not required for quadrupeds. This support for the pelvic contents and superimposed viscera of man is supplied by development of the pelvic floor — a structure not required, comparatively speaking, in the lower animals.

So with an upwright posture, we find development: 1. Of a pronounced anterior curve of the vertebral column, culminating in the promontory of the sacrum, which is more marked in man than in all other animals; 2. Broadened ilii; and 3. A well-marked pelvic floor. The latter concerns us at present, and we assume that this floor is necessarily developed in proportion (*a*) to the degree of broadening of the ilii, and (*b*) to the degree of erectness. These assumptions are self-evident, if the pelvic floor is the result of an upright gait. The broadening of the ilii is most marked where the pelvic inlet is largest, and we naturally find the most capacious inlet in the highest races, because the size of the inlet is, no doubt, determinded by growth and pressure of the head. Since the size of the pelvic outlet develops in proportion to the inlet, the floor must likewise develop, so that in the lower races we must have a proportionately equal resistance of the perineum, as in the higher races. We may then properly assume that the lower races suffer from this cause of dystocia, since, as I hope to show, the factors producing the resistance are due to the upright posture alone. To digress, might we not suppose that the gradual attainment of the upright posture was coincident with greater brain development, inasmuch as such a posture favored a better blood-supply to the fœtal brain?

The degree of erectness of the animal in producing a pelvic floor is well shown when we compare man with quadrupeds. I have selected the pelvis of the Carnivora (a lion), because it contains muscular structures analogous to those in man, all the Ungulata being deficient, and having even less development of a pelvic floor (7).

It will not be necessary to tire you with a detailed description of the structures, as I wish only to refer to the changes produced by the acquirement of the upright posture. I desire especially to emphasize some of the differences in bones and ligaments. In this pelvis of a lion, we observe the long ischial tuberosity, and the slight development of the venter illii; the long symphysis of the ilium and ischium, extending beyond the sacrum, and formed by coalescence of what in man become the rami of these bones; the slightly marked promontory of the sacrum; the straightness of the ventral surface of the sacrum, which is composed of three bones; the rudimentary spine of the ischium; and last, with mobile caudal vertebræ, a most capacious outlet.

The ligaments — the sacroischiatic — are described in quadrupeds as membranous structures, to afford attachment for muscles, and, as one anatomist states, "rather to close the outlet than to bind the sacrum to ilium and

ischium" (8), for the sacroiliac ligaments receive the tension, and are strongly developed. These sacrosciatic ligaments are attached to the sacrum, and fibers pass to the first and second caudal vertebræ, though they are not well enough developed to restrict extension movements of the tail.

Now, in man the upright posture has changed the pressure on the heads of the femora, so that, while in quadrupeds we find the weight sustained by the ilium and ischium, in man it is borne by the ilium and pubis. Were it not for the fact that man is a sitting as well as a standing animal, and that in sitting the ischii support all the weight, transmitted to the ilii and pubes, we should have the ischium forming as small a part of the acetabulum as the pubis does in quadrupeds — about one fifth or one sixth. Indeed, in the kitten we do not find the os pubis entering the acetabulum — a small triangular bone filling out the part not completed by the juncture of the ischium and ilium. (Reighard and Jennings.)

We need not go further in these changes, but shall confine ourselves to the outlet. Here, in man, we have the membranous sacroischiatic changed to a well-marked ligament, one of the best defined in the body, for its presence is demanded to aid in closing the posterior part of the outlet. So well does it respond to this demand, that it has become much hypertrophied, and the attachment to the first two caudal vertebræ of animals above referred to has, by constant tension in effecting this closure, caused these vertebræ to become fused to the three true sacral vertebræ, which alone support the pelvis, thus forming the sacrum as we commonly find it. Further, with increased demand for support, the attachment has been extended to include all the existing coccygeal vertebræ. So great, too, has been the demand for its support, that it has drawn out the rudimentary ischial spine until it tends to reach the sacrum or coccyx. In like manner its attachment to the ischial tuberosity has shortened the ischium and drawn it backward so as to lengthen the rudimentary ramus extending to the pubis, producing a pubic arch at the expense of the long puboischiatic symphysis. In man the pelvis is the center of opposing forces, due to the perfection of the upright posture.

While I can refer to no authority for the belief that these extensive bony changes are due to an upright posture, as corroborative evidence I may add the following facts: (*a*) Human sacra have been described as having but three vertebræ (6). (*b*) Paterson (9) has shown that "the sacral curve is deepest opposite the third sacral vertebræ, and the curve greater below than above this point." . *c* . "In man, this curve is not fully developed until the child has assumed the upright posture." (*d*) In the case of a woman, 31 years old, who had been bedridden from infancy, Gurlt (10) states that the autopsy showed the pelvis had retained its fœtal characteristics; that is, there was absence of the sacral curvature, and the anteroposterior diameter at the brim had not shortened, while the transverse diameter had not proportionately lengthened. (*d*) In the anthropoid apes we find the changes transitional between the lower suborder of Primates and man. In the human infant, true to the biogenetic law, we have all the pelvic characters approaching the simian type. From a consideration of these facts, it seems to me that the changes as outlined merit belief. They are based on simple laws of gravity and mechanics.

The muscles forming the closure of the pelvis in quadrupeds pass either from the sides of the anus (retractor ani), or, where there are bony attachments at both extremities (as in the iliocaudalis, pubocaudalis, and ischiocaudalis of Reighard and Jennings), the distal attachment is to the movable caudal vertebræ, while analogues of these in man pass to the coccyx — a fairly immobile structure — decidedly unlike the caudal vertebræ, in having none but rudimentary extensor muscles. These muscles closing the pelvis in quadrupeds are not strong, having no visceral weight to support, and must be long, to permit elevation of the tail. In man, they are strong and short for the contrary reason. Likewise in quadrupeds, we find no tense, resisting fascia, for a structure like the pelvic fascia of man could not develop, when its very function of being unyielding was injurious to the mobility of the tail. I believe that in the so-called levator ani muscle and pelvic fascia we have unique structures, these not being found, comparatively speaking, in quadrupeds; that this muscle developed, as its need

was developed, from the planes of the slowly strengthening pelvic fascia to act, as Holmes has said, as a tensor of that fascia; that it developed as the pelvic bones changed their relations, as the slow changes in the foot progressed, as the posterior limbs lengthened, as the soleus and glutei developed, freeing the anterior limbs — in a word, as the upright posture developed.

At this stage the strong reinforcing central tendon developed between the vagina and rectum, and to aid it, the insertion of the transversus perinei muscle shifted from the sides of the anus (from the sides of the sphincter ani internus of quadrupeds) forward to the central tendon, to steady that structure. This tendon is stronger in the female, to compensate for the weakness in the floor, produced by the vaginal aperture, and because the pelvic outlet is larger than in the male.

Another factor besides the visceral weight contributed to the need of a strong pelvic floor. In quadrupeds, the respiratory movement is costal; in man, it is abdominal. The costal type has been described as normal for women, but Mays (11) found the abdominal tracings for 82 Indian girls, who had never worn corsets, to be the same as for males. We can readily see the result of abdominal respiratory movements on the so-called "pelvic diaphragm."

With this synchronous, progressive development of the sacroischiatic ligaments, the pelvic fascia, and levator ani muscle, we can see how a constant and increasing traction on the coccygeal or caudal vertebræ resulted, and greatly disturbed the former even balance between the levators and depressors of these vertebræ, and how the reinforcing of the depressors by this traction gradually gave to them the victory; so that when the conflict was over, the tail had been eliminated, the caudal vertebræ, in part, fused with the sacrum, the remainder forming the coccyx. The extensor coccygis muscles became rudimentary, and a like fate befell all the depressor muscles which were antagonistic to the action of the elevators, except the muscle whose attachment to the side of the ilium alone favored closure of the pelvic outlet; i. e., the coccygeus of man, or depressor caudæ lateralis of quadrupeds.

It may be said that such a slight disturbance of balance could not effect such a change. On the contrary, we know all changes in nature are the result of the slight deviations; and, as Haeckel says, "the multiplication of the smallest causes produces the greatest effects" in nature; while here we have the development of what is virtually a new muscle, aided by ligaments developing new functions, and fascia gradually becoming more unyielding. Indeed, convincing proof of this theory of the loss of the tail seems apparent from observation of the anthropoid apes. Their habitat is almost entirely arboreal, and the retention of such an organ would certainly be as great an advantage to them as it is to the monkeys. But they swing from limb to limb, with the body-weight suspended by the arms, or stand on the posterior limbs with the aid of the very long arms touching the ground or grasping a support; so that the same mechanical forces above considered have demanded the development of a pelvic floor, and they have lost the tail because this development was not possible with its retention.

To sum up, we find in quadrupeds nothing, comparatively speaking, which forms a true floor: 1. Because there is no visceral pressure to be supported; 2. Because all the muscles pass separately to the caudal vertebræ, not being strongly joined at the central tendon; and 3. Because the elevation of the tail prohibits shortening of these muscles, and prohibits reinforcing by an unyielding fascia. We find that the function of the levator muscle in quadrupeds is to draw the anus forward after defecation, preventing prolapsus; so that, in the absence of a floor, and with the elevation of the tail, we are not surprised to find the second stage of normal labor in quadrupeds completed in a very short time, and often followed in the cow by eversion of the vagina and part of the uterus without lacerations. (2) Fleming. We may infer that pain with them, in this stage, is due to stretching of the vulva.

But it may be said that if the extension or elevation of the tail lengthens the vertical diameter of the outlet in quadrupeds, the same increase of the anteroposterior diameter occurs in woman, because "in defecation and labor the coccyx can be displaced two centimeters" (1). This hardly seems true of defecation, for we find this bone ankylosed to the sacrum late

in life, and more commonly in the female. But, admitting the statement in its entirety, I do not see how this backward displacement can do anything but make the perineum more tense, in the presence of a comparatively unyielding fascia, tough central tendon, and greatly hypertrophied muscle (from one eighth to three eighths inch in diameter: Lusk). That this is true, and that the forced action of the coccyx is not analogous to the action of the caudal vertebræ, is shown by tears in women and none in quadrupeds, where the structures are exercising normal functions.

It was not my intention to speak of any cases other than occipito-anterior presentations, but, since perhaps one half of such presentations at the outlet entered the brim with the occiput directed posteriorly, it seems necessary to refer to them. Pinard (12) says fifty per cent so engage, and rotation during descent is effected in probably all but three or four per cent of such cases. Likewise in quadrupeds, both these positions normally obtain, though by many writers the posterior is regarded as more common. In both positions no rotation occurs, because the canal is straight, having walls of comparatively equal length. As has been shown, the upright posture has changed this to a curved canal, and produced a pelvic floor. We are then confronted with the fact that similar presentations occur in man and quadrupeds with about the same frequency; that labor in the latter is equally facile, regardless of which of the two positions obtains, while in man, though the perineum corrects the posterior position (Dubois's demonstration, quoted by Lusk and Williams), the rotation causes prolonged and more painful labor, and the presence of the perineum seems an unlooked-for obstacle. This state of affairs, even in the absence of all other evidence, seems a convincing argument for the belief that posture has developed the resistence, and gives rise to a belief that either position was normal for the distant progenitor of man, before the need of a floor arose.

We have said that, in developing the floor, two of the caudal vertebræ were fused with the sacrum, the remainder forming the coccyx. A few words concerning the possession of a caudal appendage complete the theory. Four of five coccygeal vertebræ make a small appendage, but we do not know how many vertebræ the distant ancestor of man possessed. We know that Fol (quoted by Chauveau "Compar. Anat.") has shown that, while present man has 33 or 34 vertebræ, the embryo has 38 segments. In discussing variations in the number of vertebræ of animals of the same species, he describes certain fusions in the embryo, thus accounting for the variation. In the human embryo, between the fifth and sixth weeks, "the 38th, 37th and 36th segments have fused into one, while the 35th has no longer perfect limits." "These fusions point to degenerating influences." At an early stage (Wiederscheim l. c.) "the embryo has a free, projecting, pointed appendage, resembling the tail of lower animals." This is gradually taken into the trunk and "disappearing, leaves at the point where the tip abutted against the integument, the vertex coccygeus, the radial arrangement of hairs, described by Ecker. "Just before birth a hairless area develops, which may form a pit or dimple"—the faveola coccygea of Ecker. This dimple can be readily found in young children. With the adult in the dorsal, gynecologic position, I have observed this dimple so marked as be due apparently to presence of fiber or hands, extending to the coccygeal tip. Cases have been described in which the coccyx did not recede into the groove of the buttocks, and left an eminence to be felt externally. (Braun, Wiederscheim(. I have observed a case in which the coccyx was directed posteriorly, though the woman had never been pregnant. Lissner (Wiederscheim l. c.) has reported a case of a true tail, which attained a length of 12.5 cm., and contained bony segments.

It seems to me the development of the pelvic floor, as outlined, bears a direct causal relation to the loss of the tail. Where we have a true pelvic floor, there only do we find vestigial structures of the tail. A further discussion of this point, by reference to the mooted questions of the inheritence of "acquired characters," or of the "effects of use and disuse" in development, would lead us to subjects not germane to this paper, and we will let the theory rest on the basis of the facts presented.

I wish to add that, though comparisons with existing anthropoid apes have been made, I do not believe they are the ancestors of man.

From all of the foregoing I have reached the following conclusions:

1. Disproportion of the head to outlet is due to man's subversion of the law of the struggle for existence and the law of sexual selection, by virtue of which subversion an excessive range of variation is permitted to obtain.

2. The resistance of the perineum is due to the necessary development of a pelvic floor to support the superimposed viscera, in consequence of the attainment of an upright posture.

3. In developing this floor, the levator ani muscle, coccygeus muscle and pelvic fascia drew forward the caudal vertebræ, causing elimination of the tail, and fusion of the lower sacral vertebræ, with changes in the innominate bones.

It seems to me that this subject of the ætiology of perineal lacerations has not received the attention it merits. All other physiologic acts attended only with pain excite our full share of interest, yet we have been content to permit this great suffering and injury, apparently without seeking a fair cause. I have made no attempt to discuss prophylaxis, or even to hint that nature will not permit these injuries to continue; but we can be sure that if we have an intelligent understanding of the causation, our efforts for prevention must be directed properly, so that we shall not be forced to witness absurd practices or ignorant interference. It has not been many decades, as stated by the late Dr. Agnew (13), since the most eminent authorities were divided on the propriety of any attempt at intervention, even declaring, too, that subsequent suturing was not necessary. Indeed, too many doctors of our own time appear to hold similar views.

In this effort to find what might be called a first cause for these tears, no doubt errors have been made, but, with the effort, we can take comfort in the *dictum* of Bacon, that "Truth emerges sooner from mistake than from confusion."

BIBLIOGRAPHY

1. Williams. Obstetrics, 1903.
2. Fleming. Obstetrics of Domestic Animals.
3. Topinard. Quoted by Howes, in Preface to Wiederscheim's Structure of Man.
4. Turner. Loc. cit.
5. Galton. Quoted by Bateman, Problems of Heredity, Smithsonian Inst. Rep., 1902.
6. Wiederscheim. Structure of Man.
7. Thompson. Levator Ani of Ungulates. Jour. of Anat. and Phys., vol. xxxiii.
8. Chauveau. Comparative Anatomy of Domestic Animals, 1891.
9. Paterson. The Human Sacrum. Quoted by Duckworth, in Morphology and Anthropology, 1905.
10. Gurlt. Quoted by Williams, Obstetrics, 1903.
11. Mays. Flint's Physiology.
12. Pinard. Quoted by Williams, Obstetrics, 1903.
13. Agnew. On the Repair of Perineal Lacerations. Monograph. 1873.

CERVICAL FISTULA FOLLOWING SUPPURATION IN A PATENT THYROGLOSSAL DUCT

From the Anatomical Department of the St. Louis University

By M. G. SEELIG, M. D., St. Louis, Missouri

Associate Surgeon to the Jewish and the Skin and Cancer Hospitals; Instructor in Surgical Pathology, Medical Department of the St. Louis University

THE threefold purpose of this paper is to demonstrate the facts that: 1. A patent thyroglossal duct may remain unnoticed for years, and then attract attention by the onset of acute symptoms, similar to those caused by a furuncle of the neck; 2. It is futile to attempt to obliterate these patent ducts by cauterization of the lumen; 3. The technique of removing these ducts is simple, if properly carried out. The scope of the article does not include a *résumé* of the embryology, anatomy, or histology of the thyroglossal duct, for the case to be reported furnished no new *data* along any of these lines. Bernays's (1) original article, His's (2) description of the duct, the discussion in Senn's *Pathology and Surgical Treatment of Tumors*, Bland Sutton's *Tumors, Benign and Malignant*, Butlin's *Diseases of the Tongue*, and the recent articles by Cornil (3), Morf (4), Tuholske (5), and Murphy (6) give a complete *résumé* of the histological and pathological anatomy.

In December, 1904, Mrs. K. B. sought advice concerning a small, painful tumor of the neck. The patient, a married woman, 30 years old, the mother of three healthy children, had never been sick before. Two months before consulting me, she had noticed a small lump, about the size of a pea, in the mid-line of her neck. She was positive that this small nodule was not there before this time, because she usually wore low-necked dresses, and was in the habit of scrutinizing her neck closely when making her toilet. A few days after first noticing the small tumor, she experienced a sudden sharp pain in the neck, accompanied by a "sort of cracking sensasion," which seemed to be due to a "twisting of the windpipe." The patient felt certain that the trachea was the seat of disease, for during the paroxysm of pain she had difficulty in breathing. After this acute attack, the pain subsided completely for seven weeks. Then the region about the tumor began to ache and to feel as if pierced by needles. The tumor did not increase perceptibly in size, but grew more and more red, as if a pimple were forming. There was no history of chill, fever, or chilly sensations. Except for these facts, the history of the case was negative.

Physical examination was negative throughout, except for the local condition. There was a fluctuating tumor about the size of a filbert, in the mid-line of the neck, situated at the lowest point of the thyroid incisure. The skin was reddened over the tumor and adherent to it, but not perceptibly thinned. Bordering the red zone there was an area of induration about as large as a five-cent piece. The tumor, which was tender and sensitive, could be moved about freely on the underlying tissues, by picking it up on a fold of skin. Aspiration through a hypodermic needle withdrew a drop of seropurulent fluid, containing polymorphonuclear leucocytes. The dorsum of the base of the tongue was normal in appearance. It was impossible to palpate any cord-like structure in the mid-line of the neck.

The patient was informed that she was suffering from a congenital defect, due to failure of the normal obliteration of the thyroglossal duct, and she was told that radical removal of the duct was the only rational procedure offering certain hope of cure. Both she and her husband refused to consent to this operation, insisting that nothing more radical be done than incision of the tumor and evacuation of the pus. After explaining to them the possibility of a persistent neck fistula, the small phlegmon was incised and drained. Repeated attempts to enter the lumen of the duct with ordinary and fine lachrymal probes were unsuccessful. The smallest lachrymal probe could be neither coaxed nor forced farther than one quarter of an inch.

Here, then, was a small phlegmon of the neck, seemingly very acute in origin, and differing in no way from inflammatory processes which originate in hair or sebaceous follicles. The situation of the tumor in the exact mid-line of the neck, however, aroused the suspicion of the existence of a patent thyroglossal duct, and the subsequent course of the disease confirmed this suspicion. Twenty-four hours after the incision was made, the wound ceased to discharge pus, throwing out, instead, a seromucous fluid. The wound healed down to a small opening as large as a pin-head, but this opening persisted. Attempts to secure healing by cauterization with pure carbolic acid were

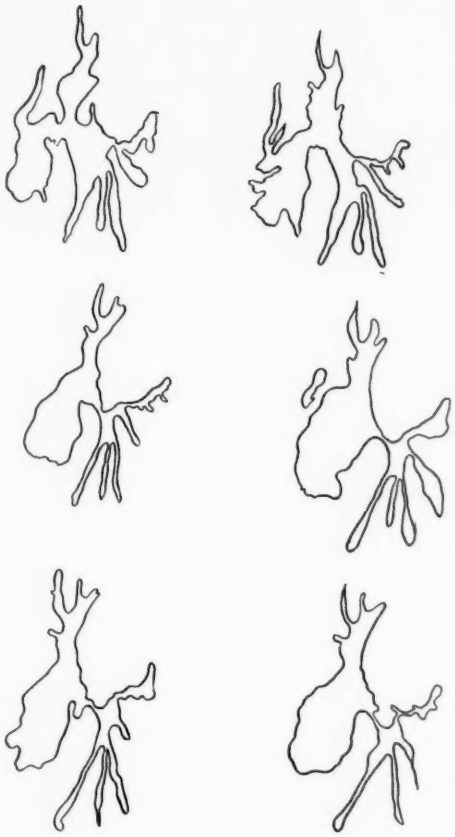


Fig. 1. Cross-sections of the duct.

fruitless, because of the impossiblity of inserting a probe farther than one quarter of an inch. The slight discharge from the fistulous opening required the wearing of a small pad, which so disturbed the æsthetic sense of the patient that she consented to radical operation about ten weeks after the first operative interference had been instituted.

Under ether anæsthesia, preceded by a hypodermic injection of scopolamine, 1-150 grain, and morphine, $\frac{1}{6}$ grain, an incision was made, circumscribing the fistulous opening. By means of this incision, the skin and subcutaneous tissue immediately surrounding the opening were raised from the underlying fascia, and thus mobilized. As soon as this mobilization was completed, a small probe entered the duct for the distance of three quarters of an inch. The probe was left *in situ*, a vertical incision about one inch long was extended upward from the circular incision, in the mid-line of the neck, and then, by exerting a little traction on the already mobilized end of the duct, the dissection of the rest of this structure, from below upward, was very easy. At its upper portion the duct was so thinned by distention that it ruptured, soiling the field of operation with a drop of muco-pus. The duct, about the size of a goose-quill, lay exactly in the median line, bound loosely to the neighboring muscles by connective tissue, and attached firmly by its upper end to the body of the hyoid bone. This attachment was divided, and the hyoid bone well curetted at the spot where the duct had been attached. It was impossible to trace any canal through the body of the hyoid. The wound was sutured without drainage. Wound-healing and convalescence were uneventful.

The point of greatest importance in the technique of removing these ducts is freeing the skin fistula from the underlying subcutaneous tissue, to which it is usually adherent. The adhesions result from the inflammatory changes starting within the duct. It is almost hopeless to attempt to find the duct in the depths, if one starts off the search through a median vertical incision. However, if the fistula is first dissected free with a collar of skin about it, and then gentle traction is put on this end of the duct, the rest of the structure stands out clearly, rendering dissection from below upward very simple.

An explanation of the futility of attempting to obliterate these ducts by cauterization is afforded by a microscopical study of the lumen. In the particular case in question, the whole duct, immediately after removal, was preserved in Zenker's fluid, imbedded in paraffin, and sectioned serially. With a camera lucida, the circumference and lumen of each section were sketched on glass plates, and then transferred to millimeter paper. By this means it was possible to reconstruct the entire duct. The reconstructed duct was then modeled in wax, and a section of the wall of the wax model cut away, so as to afford a view of the lumen. The duct became so brittle during fixation that it was

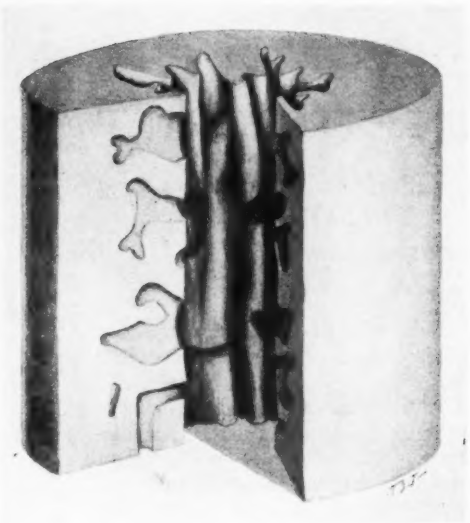


Fig. 2. Reconstructed thyroglossal duct, with a portion of the wall removed to show the lumen.

impossible to cut a consecutive set of perfect serial sections. Consequently the reconstruction must be considered as diagrammatic, rather than as absolutely accurate. For aid in reconstructing the duct I am much indebted to Professor Potter of the anatomical department of the St. Louis University.

The illustration represents a portion of the reconstructed duct, out of the wall of which a wedge has been cut. The practical difficulties which oppose all attempts to induce a closure of the lumen by cauterization are at once apparent. In the first place, it is almost impossible to introduce a probe any great distance, owing to the fact that it engages in one of the diverticulated outshoots of the lumen; and in the second place, it is absolutely impossible to destroy all the epithelium which lines the numerous tortuous, branching pockets. The illustration also shows that many of these pockets open into the lumen of the duct, at a point higher than the lowest level of the pocket. Here, then, is a condition similar to that existing in the middle ear, where the lowest point of the antral cavity is lower than its opening into the tympanic cavity. It is owing to this difference in level that suppuration, once established, persists so stubbornly.

Since the radical removal of a patent thyroglossal duct is so simple and safe an operation, and since the possibility of a cure by other means is so extremely doubtful, it is both wise and rational to resort always to a complete removal of these ducts as soon as they cause symptoms.

BIBLIOGRAPHY

1. Bernays. St. Louis Medical and Surgical Journal, 1888, p. 201.
2. His. Arch. f. Anat. u. Phys., 1891, p. 26.
3. Cornil. Rev. de Chir., Dec., 1904.
4. Morf. Surgery, Gynecology and Obstetrics, Dec., 1905.
5. Tuholske. Interstate Med. Jour., April, 1906.
6. Murphy. Jour. Amer. Med. Assn., Dec. 16, 1905.

DEPARTMENT
NICHOLAS SENN FESTSCHRIFT

BIER'S METHOD OF ANÆSTHESIA

By DR. J. SANDBERG, BERGEN, NORWAY

Translated by Carl Sandberg, Chicago.

IN the December number, 1905, of "Medicinsk Revue," I reported the first 31 operations performed with injections of stovain-adrenotin into the spinal canal.

Later on, in the Bergen hospital, suitable cases have been treated in the same way, so that at the end of the year the number of cases at our disposal was 79, and up to date was about 300. On the whole, we still are of the opinion that the method is a great advancement; but naturally there are some rocks, on which one may unexpectedly founder; and here, as in other unknown waters, the main point is to gain experience, and to communicate anything of importance to others who may wish to try the remedy. Therefore, I want to record a few cases which show how surprising the effect may be, and to search for an explanation in order to avoid, if possible, such effects in the future.

1. B. N., farmer's wife, from Vestnes, 52 years old, came to the hospital Dec. 11, 1905. She had during the last 8 years, at different times, but especially in the winter, noticed blood in the urine; sometimes very little, sometimes so much that the urine was like pure blood. The bleeding lasted from a couple of days to 2 weeks; she has at times been free from bleeding for years. She does not know of any cause; it began about a year after an attack of typhoid fever from which she had not fully recovered. During the last weeks she has lost much in flesh and has become weak and pale. On examination of the chest nothing abnormal was discovered. Right kidney easily palpable, perhaps somewhat enlarged. The urine looked almost like blood; no odor; alkaline reaction; microscopically, numerous red blood corpuscles—no cylinders or epithelial cells. She had very little inclination to be operated upon. She stayed in the city for several days before she made up her mind to come to the hospital, and it was only the heavy bleeding that compelled her to do so. On the day after her arrival she fainted during the cystoscopic examination. The bleeding was seen coming from the right ureteral opening, which was sowewhat enlarged; from the left ureter came clear urine. The wall of the bladder was normal.

Owing to the poor condition of the patient it was decided to operate at once, and she consented.

In order to get the "high" effect of the stovain, she was placed on her left side with a roll 18 cm. in diameter underneath the pelvis, so that the axis of the body formed an angle of about 15 degrees with the table. The common solution was used: stovain 2, sol. of sod. chloride (0.6%) 10.00 sol. adrenalin (0.001%) 10.00. The needle was introduced between the 3rd and the 4th lumbar vertebræ. As no cerebrospinal fluid came out, the body of the

J. SANDBERG, M. D.

patient was lifted up, so that the axis became parallel with the table, when the fluid appeared in the opening, but did not come out as a jet or in drops. The syringe, which contained stovain 0.07, was then screwed on to the needle and an insignificant amount of cerebrospinal fluid was aspirated, after which the mixture was injected. Immediately afterward, the body of the patient was put in the former position. The injection was given at 9:53 o'clock. After disinfection the operation began at 10 o'clock, at which time perfect analgesia in the field of operation was present. The kidney was laid bare at 10 o'clock; and was ready to be taken out through the wound, when it was observed that respiration had stopped. Sterilized gauze was then put in the wound and the patient was placed on her back. Her face was very pale, and respiration had entirely ceased; the patient was unconscious, but the heartbeat and pulse were unaffected. Artificial respiration according to Sylvester's method was instituted, and had to be continued until 10:30 o'clock, for 25 minutes. Only during the first part of this time was the patient unconscious. After 10 minutes of artificial respiration, which was performed without difficulty, the redness of the lips returned and she opened her eyes; they were large and bright and followed our work with interest; she turned her head with ease from side to side, formed her lips as if to speak, but the words came inarticulately, in spells, during ex- or inspiration. Whenever artificial respiration was stopped and the patient was spoken to, it was very peculiar to see the playing of the muscles in her face unaccompanied by any sound. Her condition, which in the beginning was decidedly alarming, changed as soon as respiration proved sufficient, so that both the patient and those about her considered it more in the light of an exceedingly interesting phenomenon, than anything to cause anxiety. The patient, later on, explained that she felt neither anxiety nor pain; she said,however, that at the beginning of the operation she felt so ill that she did not care whether she lived or died.

Working with the respiration occupied everybody's thoughts to such an extent that not sufficient attention was given to the pulse. As far as we could judge from the pulsation in the carotids, and from listening to the heart, there was nothing abnormal either in its strength or in its rythm. During the work the assistant surgeon and the interne each held an arm of the patient while I compressed the abdomen, because, otherwise, air was always pumped, during inspiration, into the intestines through the paralyzed sphincter ani. The analgesia could be demonstrated on both sides up to the clavicle. After 25 minutes had passed, respiration became spontaneous again; the muscles of the neck began to work first (especially m. sterno-cleido-mastoid was conspicuous) and later on the diaphragm and the muscles of the chest.

After that the operation could be continued without interruption, and analgesia was perfect in the field of operation. The kidney, which was the seat of extended tuberclosis, was extirpated. The patient was put to bed, and an hour and a quarter after the spinal injection, she received an injection of normal salt solution subcutaneously. At that time there was still analgesia over the thighs, while over the chest she felt pain. There was neither nausea nor headache during or after the operation. She made an uneventful recovery; the wound, which was partly stitched up and partly packed, had healed by the 27th of December. She was dismissed on January 6, 1906.

2. The second case was M. G., from Bergen, the wife of a shoemaker, 45 years old. She entered the hospital on the 6th of March, 1906, suffering from a strangulated left inguinal hernia. She was a very thin, pale woman, lay with bent knees and had an unceasing hiccough. Immediately after admission she vomited a feculent, bad-smelling, thin, yellowish-grey fluid. Pulse 128, small and soft. Tongue coated and moist. Resp.20, and sighing. Abdomen very much distended, with general tenderness and tympanitic percussion sound. The great tenderness did not permit any palpation. In the left regio inguinalis is seen a large oval tumor, which reaches down into the lab. majus. The skin over the tumor is normal and easily movable. The tumor itself may be moved a little upwards and downwards, and from one side to the other. In the tumor can be felt a cord as thick as a finger, that disappears upwards in the abdominal cavity. The external opening of

the inguinal canal can not be palpated. Great tenderness over tumor; slight dullness on percussion. Tumor irreducible.

Stovain anæsthesia. Radical operation. Between second and third lumbar vetrebræ, stovain 0.07 was injected, the patient lying on the right side. Cerebrospinal fluid came drop by drop. Before the injection, cerebrospinal fluid 0.4 was aspirated in the usual way. Immediately after the injection the patient was put on her back with her head low. The injection was made at 3:40 P. M., stovain in the usual dose 0.07 and adrenalin in usual proportion was injected. At 3:48 there was a perfect analgesia over the field of operation, and complete paralysis of the lower extremities. Then the operation began. Shortly after, it was observed that the patient was pale, cyanotic and perspiring; the nurse could not feel the pulse; respiration was labored. Subcutaneously 0.20 ol. camph. and 0.20 caffein was injected, and normal salt solution was also given hypodermically. At the time this happened, the intestine slipped in, and wind and fæces passed. In the meantime respiration became worse; there were forced respiratory movements, especially noticeable in the accessory muscles on the neck; but after a few powerful compressions of the lower part of the thorax, respiration improved for a short time. The improvement did not last long, however; respiration again grew worse and a little before 4 o'clock, not quite 20 minutes after the injection, ceased completely. Sylvester's method was therefore applied immediately. The condition was then as follows: The patient was pale, cyanotic, perspiring and very cold; pulse not to be felt. She was conscious, however. Asked to breathe, she shook her head and moved her lips, but only an incomprehensible whispering was heard. The artificial respiration was effective. Deep ins- and expiration was produced. At the same time the cardiac region was compressed as much as possible. After ten minutes a few voluntary respiratory movements ensued, but these ceased shortly after, and we had to continue with Sylvester's method immediately. Possibly owing to the short discontinuance of the artificial respiration the patient got worse, and at 4:20 the situation was as follows: The patient almost without reaction; to all appearances dead; quite cold; on auscultation, no heart-sound; no reaction when spoken to; corneal reflex hardly noticeable; the arms, which had been moving voluntarily till then, were quite limp. We kept on with Sylvester's method until 4:43, about 45 minutes after we had commenced. Then she began again to breathe perfectly normally; both abdominal and thoracic respiration present; heart-beat could distinctly be perceived on auscultation, and pulse in the carotid could be felt; a little later also a small pulse in the radials. Looks well; is now gaining quite rapidly; respiration quiet. At 5:30 P. M., pulse 126, regular. After the operation, one quart of normal salt solution was given subcutaneously; camphor and caffein were given every 2 hours.

March 7. Vomited a few times last night. Now feels well. Pulse 112, small, soft. Abdomen somewhat distended, not tender. Give digitalin 0.001 subcutaneously.

March 8. Gas has passed. Condition satisfactory.

March 27. The improvement has been steady and good. She is up to-day. The wound has healed.

For about 2 years the patient has suffered from descensus uteri, and during that time she has worn a pessary. This was removed to-day. Uterus somewhat enlarged and retroflexed; situated very low, orificium uteri being almost in introitus vagina when patient is standing up It is freely movable in every direction. No filling-up on the sides or in the fossa of Douglas.

April 7. Extirpatio uteri per vaginam. Stovain anæsthesia. Stovain 0.07 was injected between 3rd and 4th lumbar vertebræ. After 10 minutes, complete analgesia of the lower extremities and up to the umbilicus. Patient became somewhat cyanotic and began, in the same manner as did the previous patient, to take deep sighing respiration and to complain of a feeling of weakness. She retained her voice, however, the whole time. She was given cognac by teaspoonfuls, and the operation was performed without any other difficulties. As soon as the analgesia was complete the whole uterus was extirpated.

April 9. The condition entirely satisfactory. Euphoria.

April 28. The wound in the vagina healed without infection. Out from the somewhat retracted scar a number of catgut sutures were protruding. These were not removed. The patient was dismissed with advice to appear after a few days for observation.

She was again admitted to the hospital on June 12, 1906, under the diagnosis of prolapsus vagina. The following is a description of her condition:

After she began to go about the house, more and more of the vagina came out, and she has had considerable bearing-down sensation and feeling of heaviness. In other respects she feels well. Present condition: When the patient is standing upright, especially, the anterior vaginal wall protrudes, so that a tumor the size of an apple is formed.

June 14. Under stovain anæsthesia, a round piece, about 3 cm. in diameter, of the vaginal wall was excised, after which the edges of the wound were united. Afterward plastic operation on the perineum was performed, with excision of a piece of the mucous membrane of the posterior wall of the vagina immediately behind the vulva. This piece was about 2 cm. wide and 5–6 cm. long. The edges of the wound were united by a longitudinal suture of the post vaginal wall.

July 16. Has been up lately. The wound entirely healed. Feels well. Sent home. About the stovain anæsthesia has been recorded: Injection between the second and third lumbar vert. Jet. Stovain 0.05 in the usual adrenalin solution (1–20000). After 10 min. complete analgesia. Some cyanosis. Respiration somewhat moaning. Pulse good. Feeling of weakness. Time of operation 40 minutes. No after effect.

3. The third case was G. O., a laborer, 82 years old, from Laxevaag. He was admitted to the hospital March 12, 1906, 1 A. M., suffering from strangulated inguinal hernia on both sides. He looked very feeble; grayish-pale; extremities, cold; pulse 64, a little irregular; arteries rigid; respiration 24; tongue coated with a white fur. On the right side there is an inguinal hernia as large as an ostrich egg, which occupies the whole scrotum. It is tense and tender, with tympanitic percussion note. On the left side a large hernia, a little smaller, however, than on the right side. This also is very tense and tender. Injection between 2nd and 3rd lumbar vertebræ was given; the cerebrospinal fluid came out in drops. It was slightly blood colored. After having aspirated about 0.50 c. cm. spinal fluid, stovain 0.06, plus adrenalin in the usual proportion, was injected. The injection was somewhat painful. It was performed at 1:35. About 1:40 both hernias were reduced with ease. A little later the patient was placed on a pelvis supporter for the adjustment of a compression bandage. During this time his head was lying on the table so that there was a slightly declining position of the body. Nothing strange was observed. The patient was put into bed at 2:05. Pulse and respiration were normal. At 2:20 the patient became cyanotic, cold, perspiring. Pulse 60, irregular. Respiration superficial. Five minutes later his condition became very serious. He was quite cold; the skin moist; color bluish, pale; respiration hardly noticeable. The patient absolutely without reaction. No cornea reflex; no perception of pain; no reaction anywhere on pricking with a needle. Pulse intermittent, now and then imperceptible. Later on the pupils were without reaction. Artificial respiration was now instituted, and was continued with small interruptions till 4:20. All the time the patient was in a deep coma. The resemblance of this condition to chloroform narcosis with impending exitus letalis, was striking. At 4:20, regular, good respiration began. Pulse 64, quite powerful, somewhat irregular. A little later he became warm, and the color of the face normal. The cornea reflex and the pupil reflex returned, and he showed reaction on needle pricking; but the soporose condition continued until about 6 o'clock, when he was able to answer some questions. Later on the patient during most of the time was lying in a soporose condition, quite limp. He was taking almost no nourishment. Pulse variable, at one time slow, about 60; then more frequent, up to 120, irregular and unequal. When spoken to, he opened his eyes and tried to answer, but his speech gets more and more indistinct. Evening temperature, March 14th, was 39 degrees C.

March 15. The condition of the patient became steadily worse, his strength decreased. He died quietly at 4 A. M. Immediately before death, temperature in the rectum was 40 degrees C. His relatives forbade autopsy.

4. The fourth case was a laborer, P. O. K., from Fane, 76 years old, who came to the hospital on May 19, suffering from strangulated hernia inguinalis. He had been taken sick suddenly nine days previously, with violent pain in the abdomen, and vomiting. After that he had no bowel movement and no gas had passed. But he had vomited constantly, and during the last three days the vomiting had been fæcal. All the time he had severe pain and was given opium.

Present condition: The patient is very weak; stuporous; cannot answer questions; pale; temperature 36.5 degrees C.; pulse 130, a little irregular, small; respiration 24; abdomen distended, with high tympanitic percussion note; tender; no intestinal sound can be heard. On the left side there is an inguinal hernia a little larger than a hen's egg. It cannot be reduced; is somewhat tender. Lungs and heart normal. Stovain anæsthesia. Stovain 0.06 was injected between the 2nd and 3rd lumbar vertebrae. Spinal fluid came out drop by drop. One c. cm. was aspirated so that the fluid in the syringe turned milky.

Herniotomy: On the opening of the hernial sac a little turbid fluid escaped. Part of the omentum was found strangulated; it was tied and replaced. When the operation had proceeded so far, about 10 minutes after the injection, respiration ceased and the pulse became imperceptible; the heart sounds could not be heard. Sylvester's method was tried in vain for 20 min. Under this procedure much fæcal fluid escaped and was partly aspirated. The autopsy showed, that in addition to the hernia there also was a volvulus of the ileum just before it joins the cœcum. There was a complete occlusion of the lumen, and the intestine was quite necrotic; a small quantity of turbid fluid was found in the peritoneal cavity.

5. The fifth case was M. V., the wife of a cooper, from Nygaardsviken, 70 years old, who was admitted to the hospital (medical service) on the 26th of June. She had been in the same department of the hospital before, from October 30, 1900, to January 2, 1901, with the diagnosis of ascites. At that time she had been tapped; the condition later on had remained unaltered until 2 years ago, when her abdomen again began to increase, and since then it has grown steadily, especially during the last five months, so that it now is very distressing. On June 29 a tapping was performed and 9 quarts of fluid were withdrawn, after which the abdomen appeared very prominent with protruding, brown colored umbilicus. On percussion, dullness above the symphysis pubis and in both regular inguinales. Circumference of abdomen 97 cm. By palpation, a tumor as big as a child's head is felt above the symphysis; its surface is uneven but smooth, as far as can be made out. It is hard and can easily be moved from one side to the other. Its shape is well defined and it is not tender. It seems to be adherent below, toward the symphysis, and it is floating in the fluid which is gathered in the abdominal cavity. The uterus is completely prolapsed, so that both that and the vagina can be seen. Exploration per rectum does not reveal anything more.

June 30. Stovain anæsthesia. Stovain 0.055 was injected between 2nd and 3rd lumbar vertebræ. Clear spinal fluid in pulsating jet; 2 c. cm. were aspirated, with completely milky appearance. After 5 minutes Trendelenburg's position. There was then complete anæsthesia of the field of operation, and the operation began. Thirteen minutes after the injection, respiration ceased, and the operation had to be stopped. Sylvester's method of artificial respiration was instituted, and powerful inspirations and expirations were made; pulse imperceptible, but heart sounds could be heard. Shortly afterwards the cornea reflex had disappeared. Ten minutes after the cessation of the respiration, heart sounds could no longer be heard. Sylvester's method was continued 45 minutes without results.

The tumor was extirpated post-mortem. It was a solid, ovarian tumor about the size

of a child's head, arising from the left side. In connection with this tumor was found a large, perfectly collapsed, unilocular cyst, which was connected through a small opening with the abdominal cavity. The cyst was adherent to the anterior abdominal wall by two cord-like and one broad adhesion. In the wall of the cyst were numerous deposits of lime.

The findings as to the spinal canal and cord, were as follows: Around the puncture in tne lumbar region some hemorrhage in the muscles. The puncture is between second and third lumbar vertebræ. No lesions of the membranes of the spinal cord. Spinal fluid is present in large quantities, and does not show anything abnormal. Cauda equina seems to be on a level with the puncture, not the slightest lesion of the cord, or of its membranes, or of the roots, can be discovered. No hemorrhage anywhere.The spinal cord seems to have the usual amount of blood, and it seems to be of normal consistency all over.

With regard to the first case, my reasoning has been as follows: It may, with a great deal of certainty, be assumed that the respiratory paralysis was due to mechanical causes; the injected amount (owing to the position of the patient) spread quickly to the upper part of the spinal cord, which is connected with the respiratory mechanism. Always before, when we operated under stovain analgesia in the Trendelenburg position, it had been done in such a way that the patient, as soon as the injection had been given, was put on his back, with the whole body on the same level. Disinfection was then performed, before the head was lowered. In this way five to ten minutes had elapsed from the time of the injection until the position was changed. Under these circumstances we never saw anything dangerous. The injected quantity always has been of the same strength. Whether the nervous centre of the heart had been affected simultaneously with that of the respiration or not, we are sorry that we cannot prove; as mentioned, there was not observed any difference in its rythmical movements.

Another thing which might have exerted some influence, is the circumstance that no spinal fluid came out before the stovain fluid was injected; owing to this an increased pressure might be supposed to ensue; but as the injected quantity only amounts to 0. 7 c. cm., I do not believe that this increase of the existing amount of fluid has been of any significance. A third point, that perhaps also ought to be mentioned, is that the patient had suffered from profuse bleeding, and that she had fainted immediately before operation. So far, however, we have not had any experience which would indicate, that an anæmic condition should exert any influence upon the manner in which the stovain works. But as the remedy is new, all of the different questions ought to be taken into consideration.

How far up the injected solution has reached in the central nervous system may be ascertained, to a certain extent, by the existing symptoms. My first thought was, that in this instance there was a direct effect upon the respiratory centre in the medulla oblongata; but the accompanying features make this conclusion highly improbable. One can hardly imagine a direct effect upon the fourth ventricle without a simultaneous action upon the centre of n. vagus, and upon the vasomotor centre. The action of the heart, however, was normal and especially the voice, which is governed by the sup. med. and recurrent

laryngeal nerves, was undisturbed. Furthermore, the blood pressure did not seem lowered to such an extent as one would expect, if the vasomotor centre had been paralyzed. The case must be considered a paralysis of the spinal part of the motor respiratory nerves, whose roots are: for the musculi scaleni, the 2–7 cervical, (according to Kocher mainly the fourth cervical); for the levatores costarum (and the abdominal muscles as far as they are of importance), all of the thoracic; and for the diaphragm (the phrenic nerve) the three and four cervical. It may, therefore, be assumed that the direct anæsthesia hardly exerted any influence higher up than to the second cervical root, and that if it had reached the fourth ventricle, the symptoms would have been considerably more threatening. But the distance to the medulla oblongata is not very great, and it is evident, that the stovain may get up there. On the whole, it seems to me that the principal objection to the spinal anæsthesia is that one cannot determine its extent with absolute certainty.

There is hardly any doubt that it was by direct flowing of the solution, that the stovain got up as far as it did. A diffusion of the fluid would not have produced symptoms so rapidly. This would require the cerebrospinal fluid to be easily mobile, and the cavity of the skull able to contain a considerable amount of fluid. Such a view would, perhaps, not have been considered very probable a few years ago. Much was then said about the "unyielding cranium capsule." But according to all of the more recent experiences there is no reason to doubt that the above expressed opinion is correct. It cannot be doubted that the distribution of the cerebrospinal fluid between the cavity of the cranium and the cavity of the spinal canal, to a great extent follows the law of gravity according to the position of the body; consult F. EX . Kochers' article in "Nothnagels Pathologie und Therapie, Bd. ix" about "Hirnerschütterung, Hirndruck u. s. w." The pressure in the veins in the skull cavity is not so great that they may not easily be compressed, and, besides, the upper intervertebral membranes certainly will yield to the pressure, and the fluid consequently will run up into the cervical portion.

The first four cases concerned individuals who when admitted were extremely weak, two of them being, in addition to this, 76 and 82 years old respectively. About one of them, P. O. K., it has been related that lying "soporose; he can not answer questions; cyanotic; pulse 130, a little irregular, small." He had for nine days had a volvolus of the ileum, which was quite necrotic, and also peritonitis. The other, G. O., was a feeble man; the respiratory paralysis that followed, was successfully conquered; but he died four days after, and post-mortem examination was denied.

I am very much in doubt how much, or whether at all, the stovain is to be blamed in these cases; and I consider it most correct not to count them when judging the stovain analgesia, except to show that such feeble old people do not stand any kind of narcotizing. It ought, however, to be noticed that the cerebrospinal fluid flowed out drop by drop, and so far as Mr. G. O. is concerned, also that the fluid was slightly blood-tinged.

From the other three cases, however, I believe some practical conclusion may be drawn. Two of these certainly were very feeble, but not more so than many others who passed through the analgesia without serious effect. About both of these it also has been recorded that the cerebrospinal fluid did not flow out of the needle, or did so only in drops.

Bier's method (rachio-stovaisation, spinal analgesia, or whatever name we give it) has acquired such a rapid and general use, that there is very little probability of its already losing ground; but from the quite numerous records of dangerous effects, which lately have been published, it is evident that the method still is quite deficient, or perhaps that not everybody has yet acquired the right method. It is for this reason I have thought that the above reported cases might have some interest.

As regards the last case, it is almost certain that it is a case of direct intoxication. The patient received only 0.055 stovain; i. e., less than the dose that at that time was usual with us. The spinal fluid came out in a pulsating jet, and became perfectly milky before it was injected. Thus it would seem as if all of the requirements of an exact method had been complied with. The operation, however, was performed in the Trendelenburg position, but the experience both from this hospital and from other places, shows that this circumstance alone cannot be the cause of death. The post-mortem showed that the injection had been made without leaving any mark within the spinal canal. The only thing about which, according to my opinion, we ought in this case to be suspicious, is that on the day previous to the injection she had been tapped for nine quarts of ascitic fluid. Otherwise she was in a quite good condition; especially, she was not weak. This, however, was the case with the two first recorded instances of respiratory paralysis; one of them had suffered from a bleeding, of long duration, which had taken away her strength to such an extent that she fainted during the cystoscopic examination; the other one was extremely weak, owing to a strangulated hernia; besides we should notice that with neither of these the spinal fluid came out in a jet. It is strange that with both of them the respiratory paralysis occurs as the first phenomenon; none of the more commonly occurring phenomena had appeared previously, such as yawning, nausea or vomiting. It is also interesting to notice that M. G., later on, was stovainized with 0.06 without the occurrence of any dangerous results. Is it because she then was in a better condition, or had she become accustomed to it? The third time the dose was less, 0.05, but the analgesia was just as good, although not of the same extent.

In all of the above recorded cases the injection was performed in such a way that the whole contents of the syringe, after having become milky by the admixture of the spinal fluid, was injected at once. Later on we began to inject the fluid in parts, in the course of four minutes. With this way of proceeding we have not observed any alarming symptoms; as a rule, also, the minor symptoms, such as sleepiness, yawning, paleness, nausea, vomiting, which usually

accompany the anæthesia, have been either entirely wanting or but slightly pronounced; pain and headache afterwards have been less.

When looking for the cause of the dangerous symptoms which followed in the above mentioned cases, we must first of all consider the possibility that it might have been due to some fault in the drug that was used. This can not have been the case, as the same solution in all instances was used for other patients, without the production of any peculiar effects. Neither has, as far as I know, the method we have used differed from that which Professor Bier is using, with regard to the injection. We have certainly not seen the spinal fluid come out in jets in every case, but in the last fatal case it is expressedly mentioned that there was a pulsating jet, and the autopsy showed plainly that no lesion of the spinal cord had been produced. Neither should the quantity of the drug have been of any significance; it is at least stated by others that without risk we may use up to 0.10.

Being convinced that the surgeon who, for some time, has used Bier's method will not again give it up, I wish to state, as a result of the above recorded cases, that when feeble patients are treated one must use comparatively small doses; that in all cases we must secure a free flow of clear, not blood-tinged, spinal fluid, and that the solution must be injected not all at once, but little by little, in the course of several four minutes.

RESUMÈ

1. Spinal anæsthesia with stovain is not without danger when the doses reach the amount of 0.055–0.070 stovain. At Bergen's Hospital, five cases of respiratory paralysis have occurred, three of these resulting in death. In drawing conclusions from the cases, Nos. 3 and 4 hardly ought to be reckoned, on account of the extremely feeble condition and advanced age of the patients.

2. In case No. 5 death followed in 23 minutes after the injection, in spite of its being performed regularly, and of the fact that only 0.055 were injected. The autopsy did not give any explanation. Stovain intoxication must be considered the cause of death.

In cases Nos. 1 and 2 we succeeded in counteracting the paralysis by artificial respiration. In one case the action of the heart is affected, in the other case apparently not. No after effects worth mentioning are observed.

3. In case No. 2 the stovainization is repeated twice without alarming symptoms and without apparent after effects.

When using the method, the spinal fluid ought to be clear and flow freely; the injection of the fluid ought to be extended over a period of several minutes and, when feeble patients are concerned, only small doses should be used.

SYPHILIS AS A CAUSE OF STOMACH DISEASE

By FRED. D. BIRD, M.S., Etc.
Lecturer on Surgery, University of Melbourne, Australia

IN spite of all that has been written about syphilis — and that has indeed been much — it is probable that the possibilities of syphilis being present in any given case have not obtained their due position in the mind of the profession generally; that a definite, but much too small, arc in the horizon of diagnosis has been accorded to syphilis. When, however, we come to diseases of the alimentary canal, excepting a certain portion at either end, we find syphilis — "the specific disease which stands almost alone in mystery and malignancy"— nearly overlooked altogether in our diagnostic search.

Although it was in a case of tumor of the gall-bladder many years ago that I first had some appreciation of the role played by syphilis as tumor in the abdomen, it is of the disease as manifested in the stomach that I wish to write more particularly now.

The pathological uncertainty which appertains to the chance of syphilis being a greater or smaller factor in the production or maintenance of ulcer in the stomach does not reveal itself in actual tumor due to syphilis in the stomach.

Gastric syphiloma is, I am sure, a definite entity of pathology, as definite in many cases as any circumscribed tumor elsewhere; and that it is fairly common, what I have seen leaves me in no doubt.

Syphilis may show itself as a tumor in any part of the wall of the stomach, but, as with other gastric tumors, it will be seen, probably on account of the physiologic wear and tear, most often at the pylorus. Again, syphiloma in this part of the alimentary tract may be associated with ulcer, or it may not be ulcerated. It may be only part of a large syphilomatous infiltrating tumor, implicating neighboring structures and enveloping even the abdominal wall, or it may be a circumscribed tumor as discrete as an early carcinoma, with as much right, considered macroscopically, to be called a tumor as the very much more uncommon fibroma of this region.

As regards its connection with ulcer, the syphiloma may be closely coterminous with an ulcer inside, or the tumor may overlap the ulcer much in all directions, or, as has been said, there may be a syphilomatous swelling and no ulceration, or an ulcer presumably syphilitic may occur with a minimum of syphilomatous thickening.

Admitting that it is a matter of great difficulty, and sometimes an impossibility, to be reasonably sure of an ulcer of the stomach being syphilitic, yet a gastric syphiloma out of the body should be recognized without difficulty. A piece of it cut out of the living body should afford reasonable surety of evidence as to its nature, and a surgeon with a mind prepared for syphilitic

possibilities should have a shrewd suspicion of syphiloma raised in his mind when, on exploration, he meets with one. He has the actual mass to decide on; its look, its feel, its relation to immediate surroundings. These may help him, although the differentiation from carcinoma may be anything but easy. In addition to the tumor, he may gather conclusive evidence from other parts; e. g., the circumferential glands may be felt *in situ*, and one may be removed for microscopical examination, and the peritoneum in some part of its accessible surface may prove telltale of syphilis.

A thickening and opacity of the peritoneum covering the spleen has long been known as a syphilitic perisplenitis, and the hepatic surface has been branded in a similar way; but syphilis leaves other markings on the peritoneum, and if these are observed, the workings of one's mind should immediately trend syphiliswards. In this part of abdominal surgery I never neglect to note the surface of the liver, not only for the apprehension of the gross changes associated with what is known as botryoid liver, but also for more delicate evidence of syphilitic work, which may be encountered in the form of bluish striæ following the course of the lymphatics, or of splotches of opaque bluish white on the serosa, or of starred cicatrices with strongly fibrous or even calcareous centers.

The parietal peritoneum, and especially the round ligament, may bring its quoto of evidence to the observant eye.

With regard to the syphiloma itself, I have observed it as a large, definite, solid new growth occurring in the wall of the stomach, not losing in density from its center to the periphery, not gradually fading away into normal tissues, but having solid bosses, and firm, partially detached masses, with as clear-cut edges as the carcinoma it so strongly resembles. It is a separate, distinct tumor, which can be picked up between the fingers — a performance impossible in connection with the widely diffused gummatous cloud enveloping together several separate tissues. Others I have seen where the resemblance is greater to a very hypertrophied pyloric sphincter, no doubt about the tumor formation, but there are no outlying processes. It is, in fact, very like an early carcinoma. I have, however, not observed any tendency to syphilomatous advance along the lesser curvature.

In an exploratory cœliotomy, mere feeling would not allow one to differentiate between one of these tumors and cancer or sarcoma. If it is only on this account, I believe that we must make an opening larger than a two-finger incision, to be sure of the condition. Of course, if only one finger be allowed access to the peritoneal cavity, the question of the presence or absence of a pyloric tumor may be settled, but its nature, if found, cannot by this means be satisfactorily decided.

If a tumor is present, it should be seen as well as felt, and even then the surgeon may be undecided between carcinoma and syphiloma. Those who are aware of this cancer-mimicking manifestation of syphilis may still think the numerical chances so much against it, that, on finding a tumor at the

pylorus lending itself to removal, the carcinomatous nature of it is predicated by the rarity of the other condition, and with the active or tacit urgency of the anæsthetist, gastrectomy is promptly performed. If the tumor prove to be a syphiloma, an unnecessary operation of prime severity will have been achieved in a subject whose long-continued toxic condition is apt to be a bar to normal healing. Such a case has occurred in my own practice, and I know of five others.

In my case the whole aspect of the complaint fitted the diagnosis of cancer. The man's age was 56; he had lost over forty pounds in weight and much strength; vomiting was a prominent symptom, and there was obvious gastrectasis. The tumor proved to be a syphiloma with much fibrosis and cicatricial contraction, such a one as would not have disappeared entirely with drug medication. At the best, a gastro-enterostomy would be needed after an antisyphilitic course of treatment. The prospects of absorption vary in each case, and the farther the fibrosis has advanced towards permanency, the less marvelous are the effects of iodide and mercury. That they can be marvelous I had the good fortune of actually witnessing recently, owing to a technical mishap.

A man, aged 45, had symptoms — viz., attacks of pain, wasting, loss of strength, and epigastric disability — which, in my opinion, rendered exploration advisable. My diagnosis leaned towards the presence of gall-stones with pyloric and portal fissure adhesions, but operation showed a smooth, rounded, movable tumor at the pylorus, which I then diagnosed as syphiloma. There were attendant markings on the hepatic and parietal peritoneum, which helped me to a correct decision. The abdomen was closed, and an explosive attack of coughing on the fourth day forced a small portion of omentum between the stitches. Iodide of potash had been given immediately after the operation, by the rectum, in full doses, and mercury had been rubbed in. Owing to my absence from town, the wound was not reopened until the tenth day, my usual time for dressing the cœliotomy wound. The peritoneal cavity was exposed again, the herniated omentum removed, and occasion taken to investigate the state of the tumor. It astonished me to find an almost normal pylorus, where, but ten days before, I had demonstrated to my class at the Melbourne Hospital a large, definite tumor formation. He has made an excellent recovery. Medical treatment will be continued, but no thoughts of gastro-enterostomy are entertained. The syphiloma here was but young, symptoms having been in existence but four months. It must be, as with gummatous formations elsewhere, that the potentialities of absorption are conditioned by the age and advanced fibrosis of the growth. Syphilomata in this position, when of short duration, may be large, but they are fleshy, succulent, and possessed of a peculiar cloudy opalescence. The older and more fibrotic they become, the more liable they are to be mistaken for cancer, and the likeness may be very close indeed.

The lymphatic glands differ in the two diseases, being softer, redder, and

fleshier in syphilis, as far as I have seen, than in carcinoma; but it is well to have the microscope to help one's unaided eye.

The syphiloma may be mural instead of pyloric, though, of the twelve gastric syphilomata which I have seen, eleven have been at the pylorus. A distinction, I think, should be made between the discrete syphiloma, which is to all intents and purposes a definite circumscribed tumor, and the gummatous infiltration which wraps up a segment of abdomen, quite irrespective of number and structure of the tissues incorporated. The former is a tumor, the latter is an infiltration, though both are due to the syphilitic poison. Of these latter I have seen a number, and some of them have enveloped portions of the stomach. The largest of these that I have seen was in the case of a hospital patient under the care of my friend and colleague, Dr. Syme.

Of the mural gastric syphiloma, the following case is an excellent example. Mrs. W., aged 36, had enjoyed good health until two years before she consulted me. At this time dyspeptic symptoms gradually began, and she lost weight, strength, and her robust appearance. When I saw her she was very anæmic, much debilitated, and evidently in severe pain. A distinct tumor was visible and palpable below the left rib margins. Operation proved this to be, not a perigastric abscess with thick walls, as I had supposed, but a syphiloma of the anterior gastric wall, as big as the palm of the hand, with processes issuing in several directions, and adherent in a part of its extent to the anterior parietal peritoneum. The circumferential glands were enlarged, reddish, and fleshy. Peritoneal scarrings and markings in the great omentum and other parts, with the almost opalescent look of the tumor, constrained me against operation. A portion was removed for the microscope, and the pathologist to the Melbourne Hospital assured me that he had never seen endarteritic changes more easily guaranteed as syphilitic than those in the specimen.

In five weeks the patient, under syphilitic treatment, had gained health and strength, and had recovered from her anæmia in a wonderful way. The tenderness and the tumor disappeared together. In this case, if I had not, from previous experience, been on the *qui vive* as regards syphilis, I should very likely have made one of two mistakes — either removed the growth and a large portion of stomach with a part of the anterior wall, or else closed the abdomen, with a fatal prognosis.

The likeness of some syphilitic manifestations of the stomach to malignant disease, the onus of proof one way or the other lying with the surgeon; the difficulty, in some cases, of deciding without the microscope — these lead the surgeon into a somewhat unsurgical position. He explores the abdomen because of his desire to find out the cause of certain symptoms; he finds a tumor which he cannot deal with, because of his ignorance of its nature. If it is cancer, nothing but a wide gastrectomy, including the removal of the lesser curvature, will suffice; if it is syphilis and there is no gastric dilatation, medicine is all the patient needs. Surely, the removal of a piece of the growth

or of a gland is the only rational action on the part of the surgeon, to be followed either by a gastrectomy shortly in one case, or by a course of antisyphilitic treatment immediately in the other. No surgeon likes to reopen his abdominal wound shortly after making it, but that is better than to perform an unnecessary and extensive operation with much immediate danger and certain future disability. The chance of meeting syphilis on exploring the abdomen in a patient with epigastric disability is, I am sure, considerable, and worthy of wide recognition, and though what I suggest will sometimes lead to an exploration which does not explore to finality and to the misery of a second operation, anything is better than cutting out a man's stomach when he can be cured easily by medicine.

Surgeons are sometimes surprised at the way in which patients who are presumably cancerous improve after a gastro-enterostomy, done because the extent of the tumor precluded a satisfactory gastrectomy. Some of such cases are, in my opinion, very feasibly syphilomatous.

The strong liability to error being existent, it behooves us to search for evidences of syphilis elsewhere. Unfortunately, obvious signs may not be present, or may be neutral, in helping us to decide; e. g., the anæmia common to syphilis, carcinoma, and sarcoma.

The Justus test brings little or no aid; the history is fallible from many points of view; and the therapeutic test is inadmissible, because carcinoma is favorably affected for a time by iodide, and at the end of this time, which would be an irremediable waste if the case is cancer, we should still be undecided.

The coagulability of the blood test promises something, and occasionally a skiagram of other parts of the body, notably of the skull, upper ends of ulna and tibia, will lead us to believe, from ruggedness of bony contour and excessive density, that the patient is a syphilitic; but a piece of the growth or a vicinous gland is the only sure foundation for a diagnosis in this case, where the patient's life depends on the correctness of the surgeon's view.

The finding of marks of antecedent syphilis does not, of course, negative the possibility of cancer or of a mixture of cancer and syphilis. That a malignant growth may be implanted on a syphilitic base in the stomach and in the intestine, I have no doubt is true. Many admit the causal relationship in the case of the tongue, the floor of the mouth, and the cheek; and the intercalation in regard to the alimentary tract farther down is well worthy of consideration. A number of specimens in the Melbourne University Museum substantiates the statement, and a fascinating investigation into the possibly greater liability of syphilitics (toxic, as they often are, for so long a period of their lives) to cancerous degeneration yet awaits the patient and judicious collator.

In the near future, syphilitic diseases of the stomach will loom very much larger in the minds of both physician and surgeon than they have done heretofore, not only on account of their own interest and intrinsic importance, but

also because mistakes are so easily made in connection with them; and these mistakes so generally mean greatly increased risk to the patient from operation.

It is strange that the diseases of the stomach — an organ which might be expected to appeal strongly to the intelligent interest of humanity — should have waited so long to have their natural history properly elucidated. Even now we are not sure whether cancer is more likely to develop in a person with a dyspeptic past or in a person whose epigastrium has never been the seat of discomfort; and we are only beginning to appreciate that syphilis, in one form or another, may constitute a considerable proportion of stomach disease.

My own personal experience of gastric syphilis now comprises a good many cases. I have no doubt that it often exists; that it leads to death or profound depreciation of health; that it is often diagnosed as cancer or ordinary chronic inflammation; and that operation is advisable, not only for diagnosis, but also because I think that operation in some way assists the absorption of the syphiloma or the enveloping gummatous infiltration by drug treatment. I therefore respectfully urge my colleagues to consider syphilis as a cause of stomach disease, not, as the text-books do, in the light of a curiosity, but as the explanation of a considerable number of cases.

EDITORIALS

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TREATMENT OF CANCER WITH TRYPSIN

We published in the March issue an interesting, and we believe instructive, communication by Dr. M. G. Seelig, of St. Louis, on a comparative study of the reticulum in small round-cell and lympho sarcoma. The purport of this paper was to detail experiments undertaken with a view to settling the question of the morphological identity of the two groups — small round-cell and lympho sarcoma. It occurred to Dr. Seelig that the digestive properties of trypsin for parenchymatous tissue would, by removing the cellular elements in both neoplasms, leave the reticulum in plain view, so that a comparative study would be practical. That this supposition was correct, the illustrations in Dr. Seelig's article demonstrate.

It is not, however, to that fact that we now wish to direct attention, but to a side issue arising therefrom, which bears upon a subject at present widely engaging the attention of medical science. We refer to the views enunciated by Dr. Beard of Edinburgh on the treatment of cancer with trypsin. Beard, starting out with the assumption that a relationship exists between defective development of the pancreas and the growth of carcinomata, attempts to prove that by the administration of the ferments trypsin and amylopsin, tumor growth may be aborted. Seelig's work shows the reasonableness of Beard's doctrine, in so far as it demonstrates anew the property of trypsin to digest and destroy tumor parenchyma.

The element of malignancy, however, resides in each individual cell comprising the cancer. Trypsin has not proved itself able to destroy all of the peripheral infiltrating cells of the growth. This statement is borne out by the now famous case of Morton and Bainbridge. Morton, December 8, 1906, reported the cure of a carcinoma of the breast by the use of trypsin, but Bainbridge, deploring the undue haste with which the report was made, appends the statements of several recognized pathologists, to the effect that although the center of the tumor was destroyed as a result of the injections, the peripheral growth was practically undistrubed.

A priori reasoning is an edged tool, not to be played with indiscriminately, any more than any other tool of the edged variety. This question of the trypsin treatment of cancer rests, so far, on the *a priori* deductions of Dr. Beard, unconfirmed either by clinching clinical proof or by recognized embryological laws. Moreover, there is ample room for deductions leading to conclusions at variance with those drawn by Professor Beard. For example, if the observation is correct that pancreatic aplasia and neoplastic development are correlated phenomena, it is fair to assume that by supplying the system

with the products of pancreatic activity we might check the advance of the neoplasm. It is a well-known fact, however, that the digestive ferments are by no means the only elaborations of the pancreas. This gland also serves a most important and subtle internal secretory function. On *a priori* grounds, we should expect this internal secretory activity to be of supreme importance in regulating a matter of metabolism, such as the inhibition of new growths; yet it is exactly this internal secretory function which Beard leaves entirely out of consideration.

Our attitude is not one condemning Beard's theories or hopes. We even go so far as to admit, as we have done, the reasonableness of a part of them. We do feel, however, that careful, deliberate, and sure confirmation must needs reinforce theories and hopes on a subject of such viatl importance to the human race as are those enunciated by Professor Beard.

TRANSFUSION

The idea that first actuated an attempt at transfusion was, that blood represented the life principle, since its loss was coincident with the loss of life.

It is alleged that transfusion was practised by the early Eygptians and Greeks. We read, also, that, in the case of the aged and ailing Roman pope, Innocent VIII (1492), the blood of three healthy boys was transfused, with a view to the rejuvenation of the pope, with the result that the boys died, "et papa sanatus non est." [1]

The first authentic account of a transfusion seems to be that performed at the University of Oxford by Dr. Lower in 1666. The experimenter transfused blood from one dog to another after the latter had been bled to the death limit. The measure of the success of this transfusion is the fact that the second dog (the donee) lived and showed no serious sequelæ of the operation. In 1667, and in the years immediately following, Sir Edmund King, and, later, King and Lower, transfused the blood of sheep into the veins of a man, and reported a successful result.

Several attempts were made to transfuse blood directly from one human subject to another under clinical indications similar to those which would actuate such an operation to-day. The blood, however, was transmitted through silver tubes, quills, or tubes made of intestinal membrane, bladder, or leather. It goes without saying, that the transmission of the blood through such foreign materials would, in a large proportion of the cases, lead to the clotting of the blood, with, naturally, serious results.

Attempts following such a crude technique gave such a large percentage of failures, that this procedure fell into disrepute in the medical profession, and several European countries passed laws prohibiting it.

It was in the early part of the nineteenth century that Dr. Blundell conceived the idea that if the blood be defibrinated, this defibrinated blood might be injected intravenously without clotting. Incidental to experimental work in this field during the latter part of the nineteenth century, the following points were demonstrated: 1. That blood of the same species, or even of the same genus, may be directly transfused, and if clotting does not occur during transfusion, the blood will remain in circulation, and apparently serve as a perfect substitute for that of the donee. 2. The blood of an animal not of the same species, whether introduced directly or after defibrination, will undergo hæmolysis, the corpuscles releasing their hæmoglobin which appears in the urine. 3. Defibrinated blood of the same genus or species may be transfused, but the danger here

[1] Guy's Hospital Report, vol. lviii, p. 15. A Contribution to the History of the Intravenous Injection of Drugs. J. M. F. Birchdale, M. D.

lies in the introduction of a fluid which contains a very much larger percentage of thrombin (fibrin-ferment) than exists in normal blood. This excess of thrombin induces coagulation on the slightest provocation. Furthermore, the process of defibrination subjects the blood to the danger of introduction of particles of foreign matter, perhaps even of bacteria.

In 1870, Goltz and his co-worker, van Ott, found that the most serious symptoms of rapid hemorrhage arise from the sudden decrease in the amount of the circulating fluid, together with the moderate fall of blood-pressure. Thus the principal indication to fulfill is to replenish the quantity of fluid, without reference to the corpuscles or the nutritive element of the plasma. The fluid introduced must be of such a character as not to cause a disturbance of the system. In the first place, it must be an isotonic solution. It must be approximately of blood temperature and sterile. Warm, sterilized, normal saline solution (NaCl 0.6 per cent to 0.7 per cent), injected either subcutaneously or intravenously, has been used successfully in surgical and obstetrical cases for the last thirty years.

These saline infusions fulfill completely the indications in the case of moderate hemorrhages accompanied by a condition of surgical shock, where the principal indication to be fulfilled is to replenish the quantity of fluid.

There are, however, many cases of extreme hemorrhage in which a restitution of the quantity, through saline infusion, would not satisfy the respiratory requirements of the system (the red corpuscles being the oxygen-carriers); neither would it satisfy the needs of the tissues for nourishment. There are also cases where the blood has undergone a qualitative deterioration (as loss of coagulability) through an extreme modification of metabolism, where the patient is moribund, and has perhaps even reached the state of collapse. In such cases the new technique — direct transfusion, through anastomosis — as developed by Carrell and applied by Crile, as reported in his admirable article at the meeting of the Southern Surgical and Gynecological Association, represents pioneer work of most far-reaching significance and promise.

WINFIELD S. HALL.

TRANSACTIONS OF SOCIETIES

TRANSACTIONS OF THE CHICAGO GYNECOLOGICAL SOCIETY

JOINT MEETING WITH THE CHICAGO MEDICAL SOCIETY, FEBRUARY 4, 1907

SYMPOSIUM ON THE TREATMENT OF PELVIC INFECTIONS.

1. "Non-Operative Treatment of Pelvic Infection," by Dr. T. J. Watkins. See paper in the April number of SURGERY, GYNECOLOGY AND OBSTETRICS.

2. "Vaginal Drainage for Pelvic Pus," by Dr. Henry T. Byford. See paper in the April number of SURGERY, GYNECOLOGY AND OBSTETRICS.

3. "Radical Operation in Cases of Pelvic Infections," by Dr. Franklin H. Martin. See paper in the April number of SURGERY, GYNECOLOGY AND OBSTETRICS.

DISCUSSION.

DR. J. CLARENCE WEBSTER was asked to open the discussion. He said: I am not able to enliven the proceedings of the evening by any active difference of opinion from most of the statements which have been made; but I merely wish to refer to some points that seem to me of considerable importance.

It is certainly very interesting to trace differences in procedure in cases of pelvic infection in the modern era of our work. When I was a student the great majority of cases were treated by non-operative methods. If operation was employed, it consisted in vaginal incision and drainage of pus that was dependent, and in cases associated with incomplete abortion and retained portions of ovum following labor, curettage was also carried out. As soon as Lawson Tait's influence became felt, of opening-up the sphere of the adnexa, there was a rapid change in procedure, and in one period of nine months, which I spent in a German clinic some nineteen years ago, a free clinic moreover, scarcely ever did I see vaginal incision and drainage carried out. Almost every case, whether of an acute or chronic nature, was treated by abdominal section. Now, that again has changed, and in recent times we have had the development of the radical vaginal operation, happily disappearing, and, I should say, the characteristic features of the later stages of evolution are the insistence upon non-operative treatment in acute cases; vaginal incision and drainage, where pus is easily accessible through the vagina, and the absolute avoidance of the abdominal radical operation in all acute cases, except where general peritonitis is in progress or threatening, and in general the avoidance of the radical vaginal operation in the great majority of cases of chronic infection.

I think Dr. Watkins gave a very complete and satisfactory account of the best method of treating these acute cases by non-operative procedure. The chief difference I would mention would be the adoption of the continued ice coil, circulating ice water on the abdomen, a method very easily applied both in hospital and in houses. These patients in my experience appreciate ice water more than they do hot water, and it is much easier to keep up a continuous stream of cold water than of hot. We ought to change the hot water bags frequently.

I am not so much in favor of the continuous saline irrigation by the bowel because the water gets cold. I prefer the introduction of a pint or so of very hot saline, say from 105 to 110° at intervals.

With regard to vaginal drainage, it must be pointed out that unsatisfactory results are obtained in some cases because the drainage is not well looked after. It is a common experience that the opening made in the vaginal wall retracts within a few days or a week or two unless care is taken to keep the opening patent. I do not think we can estimate too greatly the value of vaginal drainage as a preliminary to abdominal radical extirpation in a certain class of cases. That procedure has undoubtedly led to a great reduction of the death rate in these cases.

We have a pretty good indication nowadays in the blood count, as well as in the temperature, as to when to open the peritoneal cavity. With a high leucocyte count in adnexal disease, as most of these cases are, and a temperature that is at all elevated, it is always dangerous to open the peritoneal cavity. A great many men, especially those influenced by their work on the appendix, think both structures should be treated in the same way. That is a very great mistake. We may have to interfere early in a case of appendicitis often, but very rarely for adnexal disease.

With regard to the radical operation, in closing I should like to emphasize my belief that the vaginal radical operation is a brutal and dangerous procedure, and I do not believe any man will practice it long without coming to that conclusion. It is very easy to learn from men who have practiced it to a great extent that they have had grave accidents, such as tearing away a portion of the rectum or other part of the intestine, a portion of the bladder, ureter not infrequently, appendix, etc.

Dr. Martin has given fully the reasons why the abdominal route is the best.

As regards the mortality, it is undoubtedly far safer to operate by the abdominal route. There is one more reason that has not been emphasized by him, but which I should like to refer to in particular. In bilateral disease of the adnexa, where there is no chance of leaving tube or ovary, and where the parts may be covered with adhesions, in my experience I have obtained better results by the radical abdominal procedure, which involves the removal of the uterus with the adnexa, largely for the purpose of carrying out plastic covering of the raw hole in the pelvis. It is possible, by making use of the large flap derived from the broad ligaments and shaving off the anterior wall of the peritoneal surface of the uterus, with the bladder, to cover the enormous area of pelvis in some cases, so that a complete, clean peritoneal floor is left in the pelvis, and that is certainly a great gain and advantage over leaving a stump of uterus that is like a piece of raw beef-steak, which can only serve to give rise to adhesions of the intestines afterwards.

Dr. R. R. Smith, of Grand Rapids, Mich. In a discussion of the non-operative treatment of pelvic infections we should always bear well in mind what surgery has done for this class of patients. It has revolutionized the treatment. Operation is to-day rescuing many of our women from invalidism and is, on the whole, one of the most satisfactory things there is in pelvic surgery. Ten years ago discussions on infections were frequent, and the main points were brought up and settled at that time. Since then we have been practicing along established lines, and with comparatively little change. It is well, however, as we are doing to-night, to go over our experience, ask ourselves whether we are getting the results we should, compare notes, ascertain the experience of others, and find out, if possible, wherein we have failed.

Personally, I have become more conservative with regard to advising operation in some cases of pelvic infection, more especially those cases well advanced in a prolonged acute attack. Years ago I was much more radical in advising operation in such cases, and oftentimes, when operation was refused, have seen such patients recover, and remain well at least for a considerable period of time. This was not very flattering, but it was instructive. It is not wise to say that these patients, after going along for weeks, or even longer, are not going to recover, because in many of them the pathological condition gradually clears up and they recover spontaneously — at least as far as the present attack goes.

I think the use of the term "non-operative" is an apt one, for the reason that there is no such thing as a medical treatment of pelvic infection.

I was much interested in Dr. Watkins' paper; he went over the ground very thoroughly, and my ideas coincide with his very closely. I was glad to hear him speak of the futility of the local treatment. Such patients are more apt to be damaged than helped. It may cause infection or direct injury and she suffers from being tied to a doctor's office. Most patients with chronic pelvic troubles are far better operated on if treated at all.

Another point I was glad to see emphasized in the treatment of the acute cases, was giving them plenty of fresh air and sunshine. We all know that cases of sepsis do better under such conditions and with acute pelvic infection there is no exception. We have insisted in the last few years on these patients obtaining a large amount of fresh air and sunshine in the room, or actually putting them out of doors, if that is practicable, during part of the attack.

As to the two methods of attacking disease surgically, vaginal and abdominal, I reserve the former method for collections of pus in the pelvis, or where there is a rather acute process which bulges below, and where it would be dangerous to go in above. All other cases are best attacked from above, and this coincides with the views that have been expressed here to-night.

There is only one other point I want to refer to, and that was pretty well brought out by Dr. Webster, namely, the advisability of radical procedure, that is, the removal of the uterus and appendages in certain cases. I have had a considerable experience in the surgical treatment of these and have followed them after operation. I know that conservative measures often fail to give complete symptomatic relief. So as the years have gone on I have become more radical in this work and to-day I make it a general rule, if both tubes are closed and thoroughly diseased, to remove the uterus with the appendages and obtain far more satisfactory results. Of course, exceptions should be made. Patients want to be freed of pain and disability above all else, and the matter of menstruation and an early menopause, if the matter of child-bearing

has been already removed, must be made secondary. Our experience of tumors in the pelvis for which a radical operation is necessary, and the clean results that follow, should suggest to us the advisability of complete operation in some cases of infection, and my experience has borne that out.

DR. ELMERIN W. BAER. It is a pleasure to have Dr. Watkins come here with a change of heart and acknowledge that there is something besides the knife in the treatment of acute pelvic infections. But his wholesale condemnation of electricity is what struck me forcibly. The doctor must have had some experience with a three dollar Faradic battery. In the use of electricity in pelvic cases a galvanic current will relieve a connective tissue hyperplasia, or any neurotic condition, such as rest or the knife will never do, and I would suggest its use to Dr. Watkins.

DR. ALBERT GOLDSPOHN. This subject has been very frequently discussed, but it is of such great importance that it well merits a review probably every year.

I have no great difference of opinion with the essayists; but I hold to two or three pronounced general principles, and I recognize some gross pathological processes which assist me very materially in making a probably correct diagnosis, and assist me particularly in the choice of surgical procedure, if such is necessary.

A general principle has been recognized by the essayists of this evening, but it has not been sufficiently recognized by the general practitioner. Those of us, who have cases sent to us by our medical friends in hospitals, know very well that patients are sent to us who are acutely sick, and the family physician frequently is at a loss to say whether it is a pelvic peritonitis that comes from the genitals, or an appendicitis. If it is from the former, from a genital infection, there should be no surgery as long as the condition is an acute one, whether it be puerperal or other pelvic infection. There is no danger of a Fallopian tube that is filled up with pus rupturing and causing a dangerous peritonitis. A tube filled with pus practically only ruptures under the stress of a severe traumatism; but if an ovary participates in the closure of the abdominal opening of a pus tube, and is infected, the friable ovarian tissue may be perforated, and we will have a recurrent pelvic peritonitis; but under rational treatment, the pathological process remains limited; nothing serious will happen. The principle is not sufficiently recognized by general practitioners, and not quite enough by operators, that an acute pelvic infection should be treated medically until the acute stage has subsided, for very obvious reasons. If a man operates in acute conditions, everything is angry, everything is inflamed; the operator will scarcely know what he must remove and what he should save. If nature is given a chance, the angry pathological condition may be taken care of by her, so that an operation will be more limited in extent or become not necessary. The operator will then see what nature can cure and what is left for him to attend to. The result is, if this course is pursued, that many women will be saved the loss of their appendages by waiting. But the matter of the vermiform appendix comes in here seriously. It is proper, I think, that the appendix should be operated on as soon as a diagnosis of appendicitis is made, provided it is made early enough. That is, therefore, the policy that should be pursued with regard to appendicitis. For genital infection it is the opposite. It appears at once, then, how very important it is to make a correct diagnosis between appendicitis and pelvic infection from a genital source. This differential diagnosis is difficult to make. I must confess, I cannot always make it; but I dare say, those surgeons who have most occasion to exercise their tactile sense in making diagnoses of female pelvic conditions are better prepared to make a diagnosis of appendicitis in the female. I am satisfied that girls are operated on by general surgeons for appendicitis who have not had that disease, but have an infected inflamed ovary and tube on the right side, where the operation had better be deferred, if performed at all.

Now, as to the method of infection in the female pelvis proper. There is a big difference in the process of infection in puerperal conditions and infection in non-puerperal conditions. In the puerperal state, the cervix has been dilated; it is a loose areolor structure; the lmyphatics are wide open; veins have been torn. As infection enters the external os, it does not have to travel to the bottom of the uterus, to the fundus and tubes, before it makes mischief, but travels directly through the areolar or porous structure of the cervix and gets in the cellular tissue within the broad ligament and forms, what in English is called pelvic cellulitis. Others call it parametritis. If abscess forms it should be opened into the vagina; and when pelvic peritonitis results it is only secondary. The infection will in some instances pass through the upper peritoneal covering of the broad ligament, establish a mild local peritonitis, a perisalpingitis, or a periovaritis. But those infections that involve structures within the peritoneum, beyond the broad ligament, are not deep seated. If the inflammatory process, the result of infection within the broad ligament, can be overcome or eliminated, the infection above, within the peritoneum, is pretty sure to

go without any operating from above. But in non-puerperal conditions the infection, as a rule, must travel through the entire depth of the uterus, through the whole length of the tube, and then we have primarily a peritonitis, and not a pelvic cellulitis in the first instance. That is the type of infection which demands surgery from above — abdominal section; whereas infection in puerperal conditions, as a rule, is better attended to by ample drainage into the vagina, which is made best by making a transverse incision in the cul-de-sac of about 2 inches in length, with a Pacquelin cautery.

DR. KOLISCHER. While it is impossible to touch on all the points brought out in the papers, I would like to discuss a few principal features of to-night's topic.

In discussing indications for treatment, operative and non-operative, it is paramount that we should meet on a common basis, and that we should be exact in using terms describing the respective pathologic conditions.

I would suggest, for instance, that the term pelvic abscess should be abandoned in discussing specialized indications for special conditions. This term was coined and was usable in times past, when we were not so familiar with the pathology of the female pelvis. Pelvic abscess could mean intra- and extra-peritoneal accumulations of pus, and it is so very important to keep apart these different conditions if we want to discuss the indications intelligently and clearly.

The same holds good of the indiscriminate use of the term sepsis. I think we should talk of sepsis only if an infection leads to serious and pronounced changes in the general condition, produced by the involvement of the excretory organs, of the large glandular organs, and of the heart.

The whole basis of to-night's discussion is lost sight of if we do not very decisively distinguish between gonorrheal infections and all the other infections occurring in the female pelvis.

What is now the present status of opinions regarding gonorrheal infections of the internal female generatory organs?

The present consensus of opinions among the majority of gynecologists is, that as a rule we should avoid operative interference; that forms, so to say, a surgical exception; while it is a general surgical rule that at any time we diagnose accumulation of pus, it should be evacuated as soon as possible. Experience has taught us we should not do so in cases of accumulation of pus in the tubes on gonorrheal basis. I would incidentally like to say that a pyosalpinx is not an abscess. Experience has shown that in the overwhelming majority of such cases, nature undisturbed will accomplish at least as much as an operative interference, and this without exposing the patient to the dangers of anæsthesia and operation, and without mutilations. This extreme conservative standpoint might be changed in exceptional cases; if, for instance, it is necessary to restore as quickly as possible the ability of making a living to the patient.

This is a decided change from the former times, in which we practically operated on every woman whose uterine appendages were diagnosed as being invaded by gonorrheal infection.

Schauta's and Chrobak's statistics, for instance, prove that in about 45 per cent of cases, removal of gonorrheal uterine appendages proved to be a failure as to cure of the patient. A good many of the patients were worse off after the operation on account of stump-exudates, new formation of adhesions and so on, because of the persistency of the infection in the uterus and the subsequent recurrences of perimetrition.

This finally led Schauta to fixing the indication in this way; if it is necessary at all to remove the gonorrheal appendages, a hysterectomy should be combined with the salpin gectomy and oophorectomy; that truly can be called a radical operation.

The statement that the vaginal radical operation is more dangerous and less effective in its final results than the abdominal operation, is easily refuted by looking at the large statistics of men like A. Martin, Schauta, Watkins, Wertheim, Frankenthal, and others. All these men have shown that their results are at least as good as those obtained by other men who operated from above, and their mortality is certainly lower. All the technical objections which are raised against the vaginal operation are based on theorizing and not born out by the facts. Quite often it is said that in order to close up the abdominal cavity, it is difficult to form the necessary peritoneal flaps through the vaginal route, that this operation leads to excessive shortening of the vagina, and later on to inversion and prolapse of this organ. None of these statements are true.

Entirely different is the situation in dealing with gonorrheal infections; for instance, puerpeal infections. If, for example, we find an abscess, or several of them located between the folds of the broad ligament is there any reason why we should not evacuate this pus? But there are all reasons for doing it. We know that parimetritic infiltrations, if not evacuated, by and by lead to contigual peritonitis. We know that quite frequently parimetritic abscesses have a tendency of perforating into adjacent organs.

Should we wait for any one of these events to occur when it is so easy to prevent them and at the

same time, by simple dangerless incision, to relieve the patient of suffering, simply because a man wants to ride the popular hobby of conservatism?

After we have once diagnosed the parimetritic abscess, the decision whether we would tackle it from above or from below will entirely depend upon its location, and upon the point of fluctuation, where it is easiest reached. If, for instance, the posterior vaginal fornix is bulging into the vagina on account of the parimetritic abscess, if the fluctuation is felt distinctly there, and if the whole tumor can hardly be palpated from above, why shouldn't we incise from the vagina? If, however, the exudate develops toward the anterior abdominal wall; if it has detached the peritoneum from the posterior aspect of the abdominal muscles, if fluctuation is to be felt above Poupert's ligament, a man would be foolish to operate from below.

If infection has lead to general involvement, sepsis as above interpreted, then the Wernitz treatment of permanent colonial flushing is indicated and will furnish good results. In concluding, I want most heartily to endorse what Dr. Watkins said with reference to electricity in gynecology. In few cases is it of any value, in all cases it is dangerous, and in the majority of cases it is a fraud.

Dr. Channing W. Barrett: This subject is bristling with points all along the line, but I shall not take the time to discuss all of them.

I do not understand that any one, in the discussion, has undertaken to maintain that the treatment of pelvic inflammation should be of one kind — non-operative, or radical through the abdomen, or pelvic drainage — but rather there is a place for each.

I fully agree with all Dr. Watkins has said. I have used the cold coil, as mentioned by Dr. Webster, and wish to commend the use of cold irrigations per vagina also. Cold irrigations, the water running through a tube with a rubber sac that balloons out the vagina, are useful in treating pelvic exudates.

I wish to speak a word or two in regard to pelvic drainage in the acute cases when the pus is reachable, and when the patient is not doing well. I believe acute cases of pelvic inflammation should be left alone, if the patients are doing well and are going to recover. On the other hand, if a patient is doing badly, a safe operation can be done through the vagina, and some of these patients will not return for operation afterwards. Some will; but two safe operations are better than one dangerous one.

In regard to the treatment of pus tubes, I am not of the belief that pus tubes do not need operation, and in this connection I want to say a few words in regard to the technique. In dealing with pus tubes or hematosalpinx we have fluid distending the tube; we oftentimes have an ovary distended with pus, possibly with serum, possibly with blood; the tube is in the posterior cul-de-sac; it is closed, partly by being closed in, and partly by becoming adherent to the structures with which it comes in contact. If we work down in the pelvis to lift it out and get it up, sever it from the broad ligament, the pressure we produce will rupture the tube or ovary in a great many cases. The first thing that appears, if we have a walled-off pus tube in the pelvis from the abdomen, is the fundus of the uterus and beginning of the tube. If we take hold of the tube at that point, make a V-shaped incision in the uterus to take out the pus tube, and then, with forceps left on the tube, put forceps on the infundibulo-pelvic ligament containing the ovarian artery, we have that practically severed from its attachment; we cut across and catch any bleeding vessel. The large mass is still in the pelvis; lifting it up with forceps and pushing downward upon other structures, we can separate any adhesions without any more force than is necessary to lift the pus tube up. We will not rupture one fourth, perhaps not one tenth, as many pus tubes by proceeding in that way as we would if we undertook to lift a pus tube out of the pelvis before severing it. If we lift the pus tube up there is a little leakage at the end of the tube, and this pus is ready to escape into the pus-basin. Instead of holding it there or covering it up, or clamping the opening to close the leaking wall, we should sever it from the broad ligament.

Dr. Charles B. Reed. If I may divert this gynecologic flow into another channel for a few minutes, I would like to say a few words in regard to the obstetrical aspect of this question. Out of one hundred cases of puerperal infection only twenty-five per cent probably are absolutely septic, and in the other seventy-five per cent we find marvelous cures have been obtained which are reported in connection with sundry remedies exploited by sundry individuals. What is the difference between the twenty-five per cent of septic cases and the seventy-five per cent that are not septic? Bacteriology alone will tell us. We know, for instance, that, so far as the vulva is concerned, bacteria simply swarm upon it. In the vagina, except when the gonococcus is present, the secretions are hostile. We know that the uterus also may in some instances support on its surface the streptococcus, and even innocuously. What is it that makes the change between a distinctly septic infection and one that is not septic? It is the tolerance of the uterus, the individual immunity, or, if we may use a recent term popularized by

Dr. Hollister, it is the condition of the opsonic index or the ability of the uterus to maintain upon its endometrium such virulent organisms as the streptococcus without harm. And this condition accounts for the many cases wherein the temperature drops rapidly after an intrauterine injection of saline solution, to be followed later by another rise of temperature, and it will account, too, for those cases which are curetted, and which rapidly become *worse* in consequence. Again, it accounts for those cases which rapidly improve under the application of a strong iodoform-gauze tampon to the endometrium. Some of the other cases are not so easily explained.

Whatever method of treatment we adopt, we must assume a general systemic infection. Now, what has been the history of treatment hitherto? If we adopt what we may technically call the gynecological treatment, namely, hysterectomy, we obtain a mortality of fifty-five per cent in the puerperal cases. If we take up the subject from another standpoint, say the internal treatment, and give antistreptococcic serum alone, we get a mortality of 33 per cent. If we consider what may be termed the obstetrical treatment, namely, curettement alone, we get a mortality of twenty-five per cent. If we take up the treatment which we regard as tentative, and let the patient absolutely alone, we get a mortality of seven to twenty per cent, showing the difficulty of interference in these cases and the violence that is done to the tissues under such circumstances. Is it possible to secure a treatment which will lessen the mortality obtained by non-interference? I might bring before you in this connection the treatment advocated by William R. Pryor, of New York, known as Pryor's treatment in cases of puerperal sepsis, a method which has been demonstrated to be useful in his hands and when used by others. Of forty-two cases treated, he got a mortality of five per cent in cases determined as such by Döderleins method of streptococcic infections of the uterus. This method of Pryor's, if I may be permitted to briefly give a resumé, consists in the isolation of the uterus by strong iodoform-gauze. The uterus is primarily curetted, and washed out with normal saline, then tamponned with a five or ten per cent iodoform-gauze; the cul-de-sac is then broadly opened and through this opening the uterus is carefully surrounded by ten per cent iodoform-gauze in flat layers, which completely isolates the organ in exactly the same manner as the appendix is walled-off by nature during an inflammation. A self-retaining catheter is placed in the bladder and the urine examined frequently until it shows iodine by the chloroform-nitric acid test. The results are perfectly startling in some cases. In addition to this, Dr. Pryor gives a mixture of normal saline solution both by mouth and rectum, and in every case the free drainage through the vagina shows bacteria until after the first three days, when we are unable to detect any bacteria from cultures from those secretions. With results such as those given, I think it is well worthy of our consideration and I believe this method has not received the attention it deserves at the hands of the profession.

Dr. Kolischer. It is impossible to determine septic infection by Döerderlein's test; it is simply a test which shows the kind of microbes that are present.

Dr. Watkins (closing the discussion on his part). It seems to me, in the acute cases we still lose sight of the fact that the bacteria and toxines that are producing most of the symptoms are not in the abscess cavity, or in the abscess wall, but have invaded the tissues beyond the abscess. The "firing line" has extended far beyond the area of suppuration. The pus in many of these cases is only a few faithful dead soldiers who died fighting, and *per se* is of very little pathological importance.

I am very enthusiastic about the hot, low, slow, normal saline solution, with elevation of the pelvis. The heat has been maintained by a flame under the douche can. Now we are working upon an electrical coil that can be put into the douche can. This coil will be arranged to give any temperature desired, and the coil will be arranged so that the water will not get hotter as is becomes less in amount. One great advantage of the hot, low, slow saline is that patients tolerate it much better than the ordinary saline.

Dr. Martin (closing the discussion). Several points of interest to me have been brought out in the discussion of the evening.

First, is in regard to the advisability of removing the uterus in a large number (possibly in the majority) of cases in order to eliminate the whole track through which the infection gains entrance, and thereby obviate relapse.

I believe, (and I decided this a long time ago) the reason why we do not get perfect results, or we get apparent relapses after the removal of the appendages on both sides and without in any way supporting the uterus, is because the uterus not being supported by either broad ligaments, both having been removed, is liable to fall into the cul-de-sac of Douglas, into retroversion which is the first stage of prolapse, and the retroverted uterus with beginning prolapse frequently gives rise to symptoms of more severity than the symptoms from which one originally operates.

Therefore, in order to preserve the uterus without a recurrence of these symptoms, I advocated the suspension of the uterus forward in such a way that it could not fall into the cul-de-sac of Douglas, and form adhesions upon raw surfaces from which pus-sacks had been enucleated.

In my paper, however, I stated definitely that if the uterus is thoroughly denuded or the seat of apparent infection, especially when the appendages can not be saved in women past the child-bearing period, I occasionally remove the organ.

If the uterus is removed in these cases, it must not be lost sight of that the top of the vagina or the cervix, if retained, should be attached to the infundibulo-pelvic ligaments and round ligaments, in order to prevent prolapse of the vagina and obviate the serious symptoms which will otherwise develop.

It is always interesting to hear and witness Dr. Kolischer on the floor of debate. He appears to me as a veritable Ajax of the Chicago Medical Societies. As a rule, he clears the atmosphere of controversy with his lightning-like analysis and his keen rhetoric, but to-night he has not succeeded in illuminating the dark places so clearly. In discussing the question of the advisability of removing the infected area, he immediately goes on to state that not only the tubes but uterus also should be removed. Then instead of impressing us with the idea that he was entirely conversant with the subject, as I am sure he must be from his experience, he impressed us as one who has argued from the theoretical standpoint rather than from the point of view of experience. Then vaguely to substantiate his assertions, he quotes Schauta and others.

It is apparent that his criticisms are vaguely aimed at my method of procedure. I wish to emphasize that what I have presented to you to-night has been gleaned from my own experience. It is not from hearsay or from compilation. I have said "I" and "my" until you must be tired of the pronouns, but I have given you the facts gleaned from my own experience. The results of more than 900 cases have been unusually satisfactory; there have been few relapses; and I believe the reason my results were better than those of Schauta and the others quoted was because I took pains to leave the uterus in proper position, when not diseased, in order that it might act as a natural key to the support of the pelvis, and did not allow it to fall into retroversion or prolapse.

Dr. Kolischer, after removing the uterus in these cases with the cervix, would instead of using the broad ligaments and round ligaments for supporting the vagina, unite the surfaces of peritoneum on the back wall of the bladder to the peritoneum, on the front wall of the rectum. It would be impossible not to have serious symptoms from the union of these unsupported surfaces which are usually so widely separated, especially with the top of the vagina left unsupported.

I am glad I have an opportunity once more, and it is the last time I think I shall take the occasion to do it, to reply in behalf of those who see fit to employ electricity in gynecology. Usually the most virulent men against the use of electricity are those who know absolutely nothing about it, and never have had any experience with it. The reason I do not more frequently openly advocate the scientific application of electricity is not because I do not believe in its efficiency, but because of the bad reputation this treatment has fallen into through being a popular charlatan remedy. I have used it, however, and I use it now every day. I believe I know how to use it scientifically. There are many things electricity will accomplish better than any other remedy and there are many things it will not accomplish. One of the things it will accomplish, above all others, is to stimulate the nutrition of an atonic patient. A patient with a current of electricity passed through her body in any direction from any source, if properly gauged as to strength, is invariably stimulated and toned by that process. That alone is a scientific fact, which has been demonstrated repeatedly, which might be used with great effect by gynecologists in just these chronic cases we are discussing to-night.

CLINICAL MEETING OF THE CHICAGO SURGICAL SOCIETY

A clinical meeting was held at the Cook County Hospital, January 11, 1907, with the President, DR. D. W. GRAHAM, in the Chair.

DOLLINGER'S METHOD OF EXTIRPATING CERVICAL GLANDS

DR. JACOB FRANK presented two cases showing the Dollinger method of extirpating the glands of the neck. Dollinger of Budapest (*Verhandl. der deutsch. Gesel.* f. *Chir.*, 1903, vol. xxxii, p. I, pp. 161–165) calls it the subcutaneous method. An incision is made in the hair-line, through the skin, on the side where the glands are to be removed. The skin is dissected away loosely in every direction, and the involved glands are then extirpated. When the wound has healed, no scar is visible to disfigure the patient's neck.

The first case which Dr. Frank presented was a young lady, fifteen years of age, who was not a very favorable case for demonstration, as her neck was already disfigured by scars from previous operations. Her glands were involved on the right and left sides of the neck, and extended from the tip the mastoid down to the clavicle.

An incision was made through the skin on the left side, a little above the hair-line; the skin was dissected down to the clavicle, and the glands removed by blunt dissection. The cavity was temporarily packed with gauze until the glands from the right side were removed. The packing was taken out and the incision closed without drainage. These two incisions almost met, and if he had another similar case, where the glands on both sides were involved, he would make one complete incision, which would allow more space and freedom for manipulation. In this case he saved the patient two ugly scars, which would have extended the entire length of her neck on both sides.

The second case was also a young lady. She was referred to him by Dr. Lindquist for the removal of enlarged glands below the right angle of the jaw. They were very prominent, and disfigured the patient very much. A Dollinger incision was made and the glands removed. Some of the glands were adherent to the lower border of the parotid, which necessitated the removal of a very small piece of it. After the glands were extirpated, the large vessels could be seen. A small gauze drain was now placed in the most dependent part of the wound, and the skin was approximated with interrupted sutures. The sutures were left untied. The gauze was removed in twenty-four hours, and the two sutures knotted. Primary union took place. The post-operative and cosmetic resul s were all that could be wished for.

AN OLD UNUNITED INTRACAPSULAR FRACTURE OF THE NECK OF THE FEMUR TREATED WITHOUT NAILING OR WIRING, WITH SUBSEQUENT EXCISION

DR. JACOB FRANK reported the case of A. G., aged 53, married, whose family history was negative. As to personal history, there were no previous diseases. March 16, 1905, he fell on the floor, striking his left hip. He could not get up. He complained continually of severe pain. For three weeks the family physician treated him for contusion. After this the patient was taken to the Presbyterian Hospital, where he was treated by Dr. Graham. His limb was kept in extension for seven weeks; he remained in the hospital altogether ten weeks. The limb was still functionless when he left the hospital, and he had to walk with crutches. Pain was severe, especially at night.

August 25, 1905, about five months from date of injury, he was consulted by the patient. On examination, 1 ¾ inches shortening was found. By extending the limb it could be lengthened beyond the normal measurement. There was preternatural mobility between the great trochanter and caput femoris. Crepitus was obtained. Eversion of foot was not marked. The top of the great trochanter was about 1¾ inches above Nelaton's line. The heart, lungs, and kidneys were negative. Patient was sent to the Columbus Hospital, August 26, 1905, and kept under observation there for a week. A blood count was made, which showed 4, 000,000 red and 7,000 white cells. Saline solutions per rectum were given daily, and a liberal diet allowed.

Operation was performed September 2, 1905. Through a Jacobson incision, the hip-joint was exposed and the site of fracture reached. The following conditions were found: A comminuted intracapsular fracture of the femoral neck, with splintered fragments of bone and the posterior part of capsule well organized interposing. The fractured ends displaced, proximal end downward, a distal end upward. The distal end extended about four inches down the shaft, with its periosteal covering thickened and irregular, as a result of inflammatory changes. The head of the bone, which was movable in its socket, appeared normal. The interposed splintered fragments and capsule were removed; the fractured ends were freshened, smoothed, and brought in contact by abduction and

extension. The capsular ligament was sutured with chromic catgut. An iodoform-gauze drain was placed in the most dependent part of the wound and the rest of it was closed by an *étage* suture. Two steel rods were now placed under the patient, extending from between the shoulder-blades to a foot or two beyond the heels, the upper ends of the rods being previously tied loosely. An assistant now placed himself between the patient's limbs, holding the legs and rods firmly in each hand. The patient's limbs being thus in a state of abduction, he was drawn down to the edge of the table, leaving enough of the rods on it, which acted as a support. A plaster cast was applied over the dressings and rods, taking in the lower half of the trunk and the entire limb. The patient was held in this position until the plaster hardened, when he was returned to the original position on the table, and the rods were withdrawn. Before the cast was put on, adhesive strips were applied for extension. The patient was now placed in bed on a Verity splint, fifteen pounds' weight for extension being used. At the end of the third day, a fenestrum was cut in the cast, directly over the wound. The gauze drain was gradually withdrawn, commencing on the third day, and at the end of the first week all of the original packing was removed. A gutta-percha drain was introduced daily until the cavity was entirely obliterated. The wound was entirely healed in four weeks. On measuring, a three-quarter-inch shortening was present. Five weeks after the operation, the cast was removed. Union appeared to have occurred. Two days later, however, crepitus was elicited, when a Hamilton splint was applied, with ten pounds' extension. As this was not satisfactory, a second plaster cast was applied, which remained until November 1, 1905. When this last cast was removed, a Thomas hip-splint, with a high shoe on the other foot, was employed, and the patient allowed to walk with crutches. A few weeks later he was sent home. He remained comfortable, stepping on the injured limb, with the support of one crutch, and for a short period with the aid of a cane. About the 1st of March, 1906, a small sinus appeared at the lower angle of the incision, discharging a cloudy, synovial-like fluid. Patient was sent to the Columbus Hospital, March 12, 1906, and on examination the sinus was found leading upward to the seat of fracture. On rotating the limb a grating sensation was elicited. He concluded to perform another operation, and, accordingly, on March 15, 1906, he cut down on the joint through the former incision, following the tract of the sinus. On reaching the site of the former operation, the fractured ends were found united. The acetabulum, head, neck, and upper part of the shaft were diseased. There was a great deal of broken-down tissue along the tract of the sinus. The condition found explained the grating sensation, which was caused by the diseased surfaces of the head and acetabulum rubbing against each other. He then decided on total excision of the diseased bone. To do this, it was necessary to make more room, because retraction was not as easy as in the first operation, on account of adhesions and the large amount of scar tissue. A transverse incision, about three inches long, was made outwardly through all the tissues. The diseased head, neck, and upper part of the shaft were removed; the acetabulum cleaned out, and all the diseased soft parts cut away. Unfortunately, in removing the bone it was refractured. The cavity was counter-drained with rubber tubing, and packed, and the incision closed with silkworm-gut sutures. The packing was gradually removed. Complete healing took place in about twelve weeks, when the patient left the hospital. Patient was now well and attending to his business. He was able to walk without crutches. There is about four and a half inches shortening.

Dr. Frank said it was unnecessary in an ununited fracture of the femoral neck to wire or nail the bones, as the specimen showed that union would take place if the bones were placed in apposition and kept there. So far as he knew, this was the first case where an attempt had been made to unite an ununited fracture of the neck of the femur without wiring or nailing.

GUNSHOT WOUND OF THE SPINAL COLUMN

Dr. Thomas A. Davis exhibited a case of gunshot wound of the spinal column. The ball entered at a point one and a half inches below the left scapula, opposite the ninth dorsal spine, and passed inward toward the median line. The bullet could be felt in a corresponding place on the opposite side of the body. Sensation was not as acute as normal. Temperature sense was present. The plantar reflex was present, but patellar and cremaster reflexes were absent. There was involuntary contraction of the biceps on the left side. This was painful. There was rigidity of the abdominal muscles, but no tympanites. The boy also had difficulty with urination and defecation, and had to be catheterized for about three weeks. Bowel movements were involuntary. The reflexes returned on the fourth day.

A diagnosis was made of gunshot wound of the lower portion of the body of the ninth dorsal vertebra or the upper portion of the tenth, with contusion of the anterior portion of the spinal cord, without laceration of the dura. That the membranes were not lacerated was believed from the fact that there was no anæsthesia, no hemorrhage, and no

myelilis. A favorable prognosis was given, and the subsequent history was such as was expected.

The question arose whether the bullet had passed through the vertebra at all. If it had passed anterior to the spinal column, the bullet, in all probability, would have wounded the aorta or vena cava. If the bullet had gone superficially to the spine, the tract would have shown up through swelling, ecchymoses, and superficial tenderness soon after the injury. The fact of the bullet being grooved shows that it must have been in contact with bone. Motion is returning in the legs.

Vesical and rectal control have returned also. The treatment consisted in keeping the patient on an air-bed and protecting him as much as possible from pressure. About the end of the second week the bullet was removed from under the right scapula.

CARCINOMA OF THE RECTUM

In the case of this man, I did a modified Kraske operation, resecting the rectum after doing a right inguinal colostomy. This was followed by an enormous prolapse of the sigmoid. I made a transverse incision below the second foramen, and then cut transversely and longitudinally, making a double trap-door incision, not stopping to check hemorrhage, which was very slight. Subsequently, on account of the rapidity in the performance of the operation, only two or three hæmostats were used. With compression by a large dressing wrung from a hot two per cent iodine solution the hemorrhage was quickly controlled. The patient is now in good condition, he has a patent rectum, and there is no evidence of recurrence of the carcinoma. If there is no sign of recurrence after two months, I will reestablish the normal canal. The hernia of the sigmoid goes back very much at night, and sometimes is almost reduced in the morning.

GUNSHOT WOUND OF THORAX

A woman, seven months pregnant was shot, the bullet entering the sternum in the second intercostal space and to the left of the median line. It passed through the thorax, and, ranging downward, lodged against the diaphragm. The temperature was normal for a few days, and then rose. The pleural cavity was found to contain offensive pus, and gas escaped. Drainage was established, and the temperature became normal. She aborted on the fifth day, but is now in good condition.

RUPTURE OF THE SPLEEN

DR. B. BRINDLEY EADS exhibited a case he had operated on two weeks before for rupture of the spleen. The man, aged 24, was adjusting the machinery in an elevator-pit. The elevator was descending, and when he realized the dangerous position he was in, attempted to escape by jumping through the open lower door, the elevator overtaking him when his body was about half through. He was carried to his home, a few blocks distant, and about six hours later was taken to the Cook County Hospital. The constitutional effects of internal hemorrhage were plainly manifest. The cold, wet, blanched surface, the colorless lips, the small, rapid, feeble pulse, sighing respiration, the distended abdomen, sufficed to make the diagnosis of intraperitoneal hemorrhage. There were no evidences on the surface of the body as to the probable location of the source of the bleeding. He was taken to the operating-room, where preparations were hastily carried out. The incision extended from about two finger breadths below the sternum to the umbilicus, and from it gushed a large quantity of fluid blood. Examination of the liver showed no signs of injury. The spleen was the next organ sought, and upon examination a rupture was disclosed, with complete pulpification of the lower third, and almost complete separation of the organ from its pedicle. He immediately grasped the splenic artery and vein with his fingers, arresting the hemorrhage, and followed by the application of a large artery-clamp. He ligated with the lower portion of the pedicle and removed the pulpified lower third. On removal of the clamp, bleeding recurred. Accordingly, he applied the clamp to the upper portion of the pedicle, and removed the remainder of the organ. The patient was in such a desperate state of shock that he did not stop to ligate, but left the forceps in place. Salt solution was introduced subcutaneously, intravenously, and per rectum. The abdomen was closed in the usual way. The large artery-clamp was removed about forty-eight hours later. The patient made an uninterrupted recovery, and was discharged on the fourteenth day.

EXSTROPHY OF THE BLADDER

Dr. Eads also exhibited a patient upon whom he operated three years previously for exstrophy of the bladder. The child at that time was two years of age. Owing to the widespread excoriation, it was deemed advisable to perform the operation entirely ex raperitoneally. The bladder presented itself as a fungating mass through the abdominal parietes. There was an absence of the anterior vaginal wall, as well as the pubic symphysis. The space between the two ureters was utilized to establish a new anterior vaginal wall. The ureters, together with a portion of the bladder-wall, were implanted in the rectum. The Nitze type of catheter was introduced in each ureter, and retained in place for a period o

two weeks, until the healing process was complete, thus avoiding the liability of the urine irritating the healing surfaces. By this procedure the possibility of urine escaping through the original wound was prevented. The entire stream was conducted by the new route. The child is now five years of age, and is able to control the rectum, so that she now evacuates it about every four hours.

FRACTURE OF LUMBAR VERTEBRÆ

DR. WILLIAM E. SCHROEDER exhibited a case of fracture of the second and third lumbar vertebræ. The patient had occasional incontinence of urine and fæces, the cord having been injured. A laminectomy was performed, and although there was no return of motion in the legs, sensation is returning, and a large decubitus has healed. The patient can make known when he wants to urinate or defecate.

FRACTURE OF PATELLA

This patient sustained a fracture of the patella twenty-three years ago, and now has enormous exostoses developing from the periphery of the cartilaginous portion of the femur, which can be accounted for only by the fact that he had an irritation of the ends of the patella, and an exposure of the synovial surface. It is not a Charcot's joint. The joint is full of fluid and had to be aspirated. Microscopic examination was negative.

SARCOMA OF BACK

This patient was operated on for a sarcoma of the back about two years ago. Two months ago the tumor returned, and has now reached an enormous size. The tumor is of the small, round-cell variety.

CASE OF HYPERNEPHROMA

DR. A. E. HALSTEAD exhibited a case of hypernephroma, in which the initial symptom was a pathologic fracture of the left femur.

The history of the case is as follows: P. A., male, aged 54 years. Entered the Cook County Hospital in March, 1905, with a fracture of the left femur about the middle third, that had resulted from a fall on the sidewalk. The patient states that he tripped and fell while walking, and that the fracture resulted without there being any adequate violence to occasion a fracture. On examination, after entering the hospital, there was found a considerable thickening of the bone at the seat of fracture. On questioning the patient, he stated that the thickening of the femur had existed for about two years and had slowly increased, but without pain. The tumor was considered a myelogenic sarcoma, and an amputation of the thigh above the fracture was performed. The amputation wound healed rapidly, and he left the hospital within four weeks. The amputated limb was sent to the laboratory, where a report of granuloma was made of the tissue removed from about the fractured ends of the bone.

Shortly after leaving the hospital, this patient noted that at times (on two occasions that he is certain of) he passed bloody urine. This was not accompanied by any pain, and the hæmaturia was not constant. About September, 1905, there developed a tumor the size of the fist in the left gluteal region. This tumor, which is painful, has grown since slowly, and for the last six months has pulsated. At the present time there is great tenderness on pressure over the tumor, and a marked pulsation which has by some been considered expansile. There is, as can easily be determined, a marked bruit heard over the most prominent part of the tumor.

In July, 1906, the patient returned to the hospital for the purpose of having a tumor the size of a walnut removed from the scalp. This tumor was painless and freely movable, situated just above the parietal eminence. It was soft and apparently fluctuated, and was thought to be a simple wen. The tumor was removed under Schleich's infiltration anæsthesia, and submitted to a microscopic examination. He showed under the microscope a slide prepared from this tumor, which was unquestionably hypernephroma tissue.

During the last year the patient has had a constant pain in the left hypochondrium, which has gradually increased in intensity. On palpation at the present time here can be outlined a tumor in the region of the kidney, which is tender on palpation. No kidney or tumor can be felt on the right side. After having tumor of the scalp removed he returned to his home and remained until September, 1906. He has since been in the hospital.

During his stay in the hospital this time, repeated examinations of the urine have been made. In only two specimens has blood, either microscopically or macroscopically, been found. The patient states that once, when the urine was not saved, he passed several ounces of pure blood at the end of urination. His general health has remained good. He is not emaciated, but, as you see, rather inclined to be fleshy. He suffers markedly from the painful pulsating gluteal tumor. The pain in the left kidney region was most troublesome at night. The tumor in the gluteal region, which is probably a bone metastasis in the ilium, makes any operative treatment of the kidney tumor out of the question.

Since examining the tumor of the scalp, sections of tissue from the femur have again been examined by the pathologist, who finds that the secondary

tumor in the femur, which was the cause of the pathological fracture, is a metastatic hypernephroma.

LARGE FASCIAL SARCOMA OF THE LEFT THIGH

C. F., aged 27, first noticed about one year ago that there was a sensitive area about the size of the palm of the hand over the inner and upper aspect of the left thigh. About two months later he noticed a "lump" which was freely movable in the surrounding tissues, and not especially painful. This tumor grew rapidly until it reached nearly its present size within six months. During the last two months it has not grown rapidly. The patient's general condition has been good up to within six weeks, when his health began to fail. He has within the last month become very greatly emaciated and very weak.

The tumor, which is of unusual size, is spindle-shaped, soft, very vascular, but does not pulsate, and is not very sensitive to pressure. It extends from the pubic bone to the knee, and is mostly on the inner and anterior aspects of the thigh. It measures about thirty-five inches in circumference at its largest part. The skin covering the tumor shows many very large veins. Over the most prominent part of the tumor the skin is beginning to ulcerate.

CHARCOT'S JOINT

Dr. Halstead showed three cases of tabetic joint disease.

The most advanced case was that of T. W., aged 54. The left ankle was the seat of disease. The disease in the joint began two years ago, after a slight trauma, with pain and swelling. The pain quickly subsided, but the deformity has progressed. The characteristic analgesia, with luxation of the tibia and general relaxation of the ligaments, and atrophy of the articular ends of the bones, are present. He presented an X-ray showing the bone changes and deformity.

Aside from the joint lesions, the interesting feature of the case, is that under the re-educational treatment, this man has improved very greatly. He presents the classical signs of a tabetic; namely the fixed, unequal pupils, the absence of the patellar reflex, with Rhomberg's sign well marked. His sexual power was entirely lost. His ataxia was so great that he could not walk. He had lost control of his bladder, and had only partial control over the rectum. Under this treatment, with baths and massage, his ataxia has nearly disappeared. His general health has greatly improved, and he has control of the bladder function. He also maintains that his sexual power has, in part, returned.

ARTHRITIS DEFORMANS

Arthritis deformans of the polyarticular recurrent type in a male, aged 46. This case was shown in connection with the cases of Charcot's disease, for the purpose of drawing attention to some points in the differential diagnosis and pathology of the two conditions.

On entering the hospital, the patient complained of pain and swelling in his right knee, some fever, and general asthenia. Six weeks previous to his admission, the attack started with pain and swelling of the right knee. One week later, he right ankle and hip were similarly involved. Ten days later, the right shoulder, right elbow, and the left ankle became swollen and painful. At the present time the pain and most of the swelling have disappeared from all of the joints affected, excepting the right knee. There is now no elevation of temperature, although the pulse-rate is still high. He states that he has had two previous attacks similar to this one. The first, ten years ago, began in the first metatarsophalangeal oint of the right foot, and extended to most of the joints involved in this attack. The pain and swelling lasted about ten months, and then subsided, excepting the pain in the right knee, which never returned to its normal condition.

The second attack came on about six years ago. Both hips and some of the smaller joints were involved. This a tack lasted about three months.

He has had gonorrhœa twice, the first attack having occurred some time previous to the first attack of joint disease. He had pneumonia ten years ago, and has had many attacks of tonsilitis. He uses alcohol freely. He has never had syphilis.

Examination shows considerable muscular atrophy, particularly of the right thigh muscles, and to a less extent of the right arm. The chest is negative. There is no heart lesion. The right knee is swollen, tender, and partially ankylosed. Muscular atrophy above the knee is very marked. The thickening of the joint structures appears to be both intra-articular and extra-articular. There is no distinct cartilaginous crepitus upon movement of the joint. A large bony hyperostosis is seen over the internal condyles. The radiograph shows this bony growth distinctly. The right elbow shows practically the same conditions, with some periarticular exostosis, and a very limited degree of motion. The hands show the typical deformity of arthritis deformans; enlargement of the phalangeal, metacarpophalangeal articulations, with flexion, and Heberden's nodes. There are no gouty deposits.

The diagnosis of arthritis deformans is based upon: 1. The history of previous attacks of so-called rheumatism. 2. The joint changes described:

namely, ankylosis, thickening of periarticular tissues, and bony outgrowths of the articular ends of the bone. 3. The absence of temperature, and the characteristic deformity of the small joints of the hands.

HODGKIN'S DISEASE

F. J., male, aged 56, has had a swelling in the right side of the neck for four months. The mass, which has gradually enlarged, is now about the size of two fists, and extends from the lobe of the ear to the sternoclavicular articulation. It is soft, somewhat movable, and regular in outline, and not lobulated. Two months ago, there appeared a swelling in the right groin. This has slowly enlarged, until it is about the size of a small orange. This mass is irregular in shape and nodular, soft and freely movable. The glands below Poupart's ligament in the saphenous opening are as large as English walnuts. During the last month the glands in the left axilla have enlarged until they form a tumor about the size of a hen's egg. His health has been failing since the tumor appeared in the neck. He has some dyspnœa, and is slightly hoarse; otherwise nothing abnormal is found. Urine and blood examination negative.

This case is presented because of the questionable diagnosis of Hodgkin's disease.

Here we must differentiate between Hodgkin's disease, lymphosarcoma, and tuberculous adenitis.

In favor of Hodgkin's disease, we have the absence of blood changes, the progressive character of the glandular involvement, and the absence of inflammatory changes about the glands. Against Hodgkin's disease is the age of the patient, which is higher than one usually finds in this disease. He also lacks the progressive and marked anæmia that obtains in Hodgkin's disease. The temperature, which varies from 99° to 100°, is common in this disease. Two small lymphatic glands were removed from over the mastoid, just above the large mass on the right side. Microscopic examination showed simple lymphatic hyperplasia similar to that found in the glands in Hodgkin's disease. There were no tubercle bacilli found. The widely separated groups of glands (right side of neck, left axilla, right groin) argue against tuberculous lymphadenitis, and is also the strongest argument against the disease being lymphosarcoma.

DR. C. E. HUMISTON exhibited a boy, nine years old, who fell, striking his knee, but not producing any abrasion of the skin. Three days later, there was pain in the knee, some swelling and tenderness. The swelling extended down over the anterior surface of the tibia, almost to the ankle. Temperature was increased, and both pulse-rate and respiration were increased in frequency. The leucocytes numbered 20,000.

An incision was made over the tibia, but no pus was found. The following day the patient was worse, and another incision was made, extending from the insertion of the patellar tendon down to the lower third of the tibia. The medulla of the tibia was necrotic. This was scraped out, going as close to the joint as possible without opening it. He was better for three days, and then gradually grew worse. At the end of four days a pyæmic abscess was opened over the other knee. The joint was distended, and aspiration showed pus. The joint was drained according to the Fenger method. The patient improved a little, and then a gravitation abscess had to be opened on the posterior surface of the tibia.

The patient came into the hospital with a diagnosis of rheumatism. Although the patient's general condition is better, he is still in a state of sepsis.

DR. D. N. EISENDRATH exhibited a case illustrating multiplicity of hernias. The patient had three epigastric hernias and one femoral hernia.

RETROCÆCAL APPENDICITIS

This case illustrates radiation of pain. The pain was referred chiefly to the ileocostal angle, with comparatively little tenderness over McBurney's point. A diagnosis was made of probable retrocæcal location of the appendix, because some pain was felt over the colon. The appendix was located behind the colon, buried in a mass of adhesions.

INTUSSUSCEPTION

A little girl had severe pain in the abdomen, with nausea and vomiting. A diagnosis of intussusception was made, and a resection was done. The intussusception had occurred in the ileum close to the jejunum. The patient lived about twenty-four hours after the operation, and had several bowel movements.

SARCOMA OF HUMERUS

About two months ago, this patient sustained an injury, following which an enlargement appeared over the upper end of the humerus, which has grown rapidly in size. The swelling was opened twice by another physician. The X-ray showed what is probably a periosteal variety of sarcoma.

UNUNITED FRACTURE OF HUMERUS

On account of an ununited fracture of the middle of the shaft of the humerus, wiring has been done four times, a portion of the bone being removed each time. About two months ago there was perfect pseudo-arthrosis. I resected the ends of the

bones, but there is still a little motion and two inches of shortening. Aluminum-bronze wire was used to unite the ends of the bone. A triangular splint of cardboard or of wood was placed in the axilla to compensate the angle.

ASCITES

This man entered the hospital with a diagnosis of pneumonia, which was changed to probable empyæma of the gall-bladder. There was no leucopenia. An incision was made, and although no empyæma of the gall-bladder was found, there were considerable adhesions about the stomach. He had all the symptoms of a subphrenic abscess. After many attempts, fluid was found containing flakes of fibrin and pus. I made an incision in the eighth interspace, sutured the diaphragm to the costal parietes, and evacuated a pint or more of a thin serous fluid containing a small amount of pus, which seemed to be situated below the diaphragm. Gradually an enlargement of the abdomen appeared, and considerable fluid was evacuated. The cause of the ascites was unknown.

VENOUS ANGIOMA

This man has an enormous venous angioma of the thumb and first and second fingers of the left hand. It has been present for about three months.

COMMINUTED DEPRESSED FRACTURE OF THE SKULL

DR. M. L. HARRIS exhibited a man who, a year ago, had sustained a comminuted depressed fracture of the skull. He was unconscious for almost a month. Several large fragments of bone were removed, leaving an area of nearly five centimeters in diameter uncovered by bone. Recently he developed epileptic fits. He was operated on three weeks ago. There were no adhesions of the dura to the pia. The defect in the skull was covered in with a celluloid plate. He has had no fits since the operation. Before that he had them daily.

PROPERITONEAL LIPOMA

This man had for thirteen years what was diagnosed as a left inguinal hernia. A small portion of the tumor could be slipped back and forth through the external ring, thus simulating a hernia. The major portion of the tumor, which was about 20x15x10 cm. in size, occupied the left inguinal region and extended deep into the pelvis. It was a properitoneal lipoma, and the peritoneum was carried backward and inward.

TRANSACTIONS OF THE CHICAGO GYNECOLOGICAL SOCIETY

DR. FRANK W. LYNCH, EDITOR FOR THE SOCIETY

STATED MEETING, JANUARY 18, 1907.

The President, JUNIUS C. HOAG, M.D., in the chair.

EXHIBITION OF SPECIMENS.

DR. T. J. WATKINS. This is a multilocular cyst, globular in shape, and about 4 inches in diameter, which was removed from the abdominal wall. It was not attached to the skin. It extended down to the peritoneum, but the intra-abdominal surface of the peritoneum was perfectly smooth. The tumor was very friable, and a large area of peritoneum, and considerable of the rectus muscle and fascia, had to be removed with the tumor, but none of the skin.

A microscopic examination made by Professor Zeit showed the tumor to be a cystadenoma, with no suspicion of malignancy. The cysts are lined by a single layer of cylindrical epithelium.

I operated on this woman four years ago, and removed a multilocular cyst of the left ovary. The tumor was about ten inches in diameter and in character was very much like this one. It contained numerous small cavities and was very friable. There were extensive adhesions, but apparently no extension of the growth beyond the adhesions. It was impossible to remove the cyst without spilling its contents. A macroscopic examination gave a suspicion of malignancy, which was not confirmed microscopically. The right ovary appeared normal.

The woman was quite well for a year and a half. Then a tumor appeared on the other side. I did a secondary abdominal section, and removed a tumor of the right ovary. The tumor apparently had the same characteristics as the first one. The microscopic examination showed the same conditions as in the first specimen.

The growth last removed was first noticed about three months ago, when there was merely a suspicion of some induration at the site of the wound, but no well-defined tumor. When I saw the pa-

tient again, about a month ago, the third tumor was found and removed. The abdominal cavity was examined carefully, but there was no evidence of disease, so that the tumor did not extend by continuity of tissue. The probabilities are that at the second operation some of the cells were accidentally left in the abdominal wound, and from these developed this tumor.

There was a good deal of difficulty encountered in closing the abdominal wall, because of the amount of fascia removed. The wound was closed in three layers. The peritoneum was brought together with catgut sutures. The fascia was then approximated, and finally the skin.

DR. CHANNING W. BARRETT. — ENDOTHELIOMA OF THE OVARY, WITH THE REPORT OF A CASE. — See paper, *ante*, p. 549.

DISCUSSION ON DR. BARRETT'S PAPER.

DR. EMIL RIES. I wish to compliment Dr. Barrett on his very excellent paper, and careful study of this intricate and difficult subject. My personal experience coincides with Dr. Barrett's. A great many of these cases are not recorded, because the tumors are not examined properly. It happens that we have apparently a cystic tumor of the ovary; nothing special is seen macroscopically, and the tumor goes the way of most tumors, into the waste bucket.

I operated on a woman, 50 years of age, who complained of pain in the right limb, which her physician diagnosed sciatica, and treated with the usual remedies but without success. I found a tumor which had grown in the pelvis into the sciatic notch, compressing the sciatic nerve and causing pain. It was cystic and intraligamentary. I operated and removed a tumor with thin walls, of the kind you see so frequently, called paraovarian tumors. The woman made a good recovery.

About two months after her recovery, or ten weeks after the operation, I was called to operate on her for intestinal obstruction. She presented the ordinary findings of intestinal obstruction, showing active peristalsis of the small intestine visible through the abdominal wall. On opening the abdomen, I found an enormous number of small tumors all over the small intestine, omentum, etc.

Following up these tumors, which of themselves would not explain the intestinal obstruction, down to the seat of operation, I found a mass of tumors in the cul-de-sac, which surrounded the rectum like a firm clasp, thereby causing the intestinal obstruction. I removed one of these tumors for microscopic examination, and the picture was typical of endothelioma. I do not know that an examination of the tumor at the time of the first operation would have prevented a recurrence, but at any rate it would have been more satisfactory.

As to the nature of these tumors, of course everybody recognizes endothelioma as a separate class of tumors, but when it comes to differentiating them into endotheliomas and periepitheliomas, and other subdivisions, the difficulty becomes so great that we get into a real labyrinth in which it is very hard to find a way. The mass of cases which the Doctor recorded is only a drawback, not a help, and the examination of the descriptions of many of these tumors is really of very little value. If we examine only one of these tumors, it always requires a large number of sections, and sometimes serial sections. Without that I think we are liable to fall into errors of interpretation. Dr. Barrett showed us a drawing of a microscopic section of his tumor in which there were strings of cells, and at a little distance from these a few isolated cells, which he explained as going ahead of the tumor mass. Unless a large number of these sections is examined serially, one can never make such a statement, because if a string of cells dips down, or goes up and dips down again, one will get exactly this picture, though these apparently isolated cells are merely portions of strings of cells which appear in some other specimen as such. I cannot say that the cells which are separated from the string of cells in the Doctor's picture, are separated in fact. I would have to see serial sections before I could make a positive statement as to this. Of course, that is only a minor point, and it does not prove anything against the diagnosis.

As to the nature of these cells: There is nothing in such cells as compose this tumor that speaks absolutely against an epithelial nature. There is no possibility of recognizing an endothelial tumor from the nature of the cell, any more than there is a possibility of recognizing a carcinomatous tumor from a carcinoma cell. There is no characteristic carcinoma or endothelioma cell. If we wish to prove definitely and conclusively that the tumor is an endothelioma, it really is necessary that we see the endothelium itself and the continuation of that endothelium growing into the tumor mass. In no other way can its identity be proven conclusively. From the arrangement of the cells, it is very difficult to make a diagnosis of perivascular endothelioma in a case as far gone as this one. The Doctor has shown us pictures he considers characteristic of perivascular endothelioma. One of these pictures I would hesitate to accept as characteristic because there is considerable connective tissue between the vessel and the cells, so that that would

not prove it to be a perivascular endothelioma. However, in some parts of the section you can see quite distinctly a development of cells around openings which, I suppose, under the microscope, might prove to be blood-vessels. Many of these tumors are so far gone in their development that it is a matter of luck to find a place that really proves the origin from endothelium. It might be necessary to cut up the whole tumor to find that special place. Of course, we are willing to concur in Dr. Barrett's diagnosis. I only wanted to emphasize the difficulties of such a diagnosis.

The Doctor speaks of perivascular hæmangioma. That means an endothelioma developing from the endothelium surrounding the blood-vessels. We know that the brain possesses such lymphatic sheaths around the blood-vessels. It is necessary to prove that the ovary contains such lymph sheaths around its blood-vessels before we can assume a perivascular endothelioma. According to Polano's researches, there is no such thing.

Dr. George Schmauch. Dr. Barrett said that this tumor had given off metastases. That means that the tumor must have been malignant. As he said, most of the endotheliomata are not believed to be very malignant. When they recur, it is generally at the primary site.

In my opinion, there is no doubt that many cases of endothelioma of the ovary are different from the ordinary endothelioma. The picture they give makes classification difficult, which explains why there has been so much confusion among authors. I think the most prominent feature of the tumor presented to-night is the sarcomatous structure, yet the single cells of the growth show a distinct epithelial character.

The Doctor pointed out that some of these growths are found in early life, and especially this kind of endothelioma, which is very malignant. This tumor developed from a cyst. It therefore might be compared with the dermoids that we find in combination with common cystadenoma. We cannot bring this complicated kind of tumors into a classification with the general class of endotheliomata. They are probably inborn growths of teratomatous origin. Pick examined some of these tumors which were found in young girls. Some of the specimens showed cells of epithelial character, which might just as well be taken for degenerated endodermal cells as are commonly seen in embryomata and teratomata. In these only one tissue devlopes, and we find, therefore, tumors arising from endothelial tissue; but in such a case it will be found that the original tumor was a teratoma.

Dr. Barrett, (closing the discussion). Dr. Ries and I do not disagree at all on the question of the difficulty of making a diagnosis. Some of these slides could be shown to a very good pathologist and I think he would say they were sarcoma. Some of them look like carcinoma, and I assure you it took a long search to bring out some of the points in the paper. I spent many hours over the microscope, only to find that one series of slides would develop something that did not show in others. The first slide examined indicated an endothelioma, but did not show a distinct perivascular nature. Other slides showed distinctly that the openings were blood-vessels. Some slides showed bands of tissue, while others showed the lumen of the vessel. The perivascular nature of the tumor is shown in areas in which the tumor growth is advanced. There is always a mantle of cells, including the blood-vessels, so that from a thorough study of all these sections one may conclude that the tumor is a perivascular growth.

This tumor by some writers is called highly malignant, as in my case, where the woman showed severe symptoms within two weeks. The doctor who brought the case to me found the tumor enlarging day by day, so that he was very much inclined to think that it was a pelvic abscess rather than a tumor.

This was not a multilocular cyst, as some might suppose from an examination of the gross specimen.

As to the occlusion of blood-vessels and the degeneration of tissues, some slides showed dead tissues, while others showed capillaries in these tissues. There are slides, also, that show distinctly the new formation of blood-vessels ahead of the tumor area. In the slides which show the tumor growth progressing, there can be seen parallel capillaries ahead of the tumor, and then these columns of tumor cells going along with the capillaries.

As to the point spoken of by Dr. Ries, a few cells ahead of others, I was not laying any stress on that, but spoke merely of conditions as I found them in the slides. It is a matter of little importance. I was emphasizing the point that mitosis is abundant in these areas.

DISCUSSION ON DR. SCHILLER'S PAPER

Dr. Frank W. Lynch. There is one very interesting point that I should like to mention in connection with the rise in blood pressure noted at the time of menstruation. There are two theories: one, that the menstrual discharge is preceded by a rise in blood pressure, and the other, by a fall. Seven or eight years ago a woman working in Dr. Howell's laboratory, in Baltimore, noticed a preliminary rise in blood pressure just

before menstruation. Extending her investigations, she found that there was also a periodic rise of blood pressure in the male, which curiously enough was attended with various periods of excitement, and one subject confessed that it was the time he wanted to go on a periodic spree. This is a matter of some interest.

There is probably no subject in medicine about which we know so little as menstruation. We may all look forward to further experimental work on this subject with a great deal of edification.

DR. SCHILLER (closing the discussion). One of my patients was cured by curing the constipation. The other patient, who had a tumor of the adnexa, was operated on; both tubes and ovaries and the uterus were removed. She did not menstruate any more, and she had no more erythema.

DR. FRANK A. STAHL mentioned a technique which he had found of considerable value in increasing the comfort of the patient after a repair of a torn perineum. He discovered accidentally, while operating on a perineum by candle light, that the drippings from the candle sealed the ends of the silkworm-gut sutures effectively, and prevented irritation of the skin from the ends of the sutures, which otherwise would have been stiff and hard. He has since made use of this method in a number of cases with good results.

CASE REPORT

SEPARATION OF THE RADIAL EPIPHYSIS

BY W. W. GRANT, M. D., DENVER, COLORADO

REPORT OF A CASE OF SEPARATION OF THE RADIAL EPIPHYSIS CAUSED BY THE RECOIL OF AN AUTOMOBILE CRANK

J. R., aged 19 years, on September 25, 1906, while turning the crank preparatory to starting the machine, lost his grip, or the control of it, and though the hand was not dislodged, the crank recoiled with such force as to damage the wrist-joint, resulting in immediate disability. I saw the patient at my office in fifteen minutes. The wrist and hand presented the characteristic deformity of a Colles fracture. The palmar prominence of the wrist was exaggerated from effusion of blood, while the distal fragment presented the usual posterior deformity. The patient was very pale, in severe pain, and complained of faintness. The reduction was effected immediately, with distinct crepitus. The position was good, and there was no tendency to redisplacement. On the third day the rediograph was taken, showing the line of separation very satisfactorily. The side view shows the opposition not quite perfect.

Ossification between epiphysis and shaft, at this joint, is not usually complete before 21, and it would seem surprising that this particular form of accident is not more common. When due to a new cause, I deem it worthy of being reported.

ABSTRACTS OF CURRENT LITERATURE

DEPARTMENT OF SURGERY

UNDER THE CHARGE OF

JOHN B. MURPHY, M. D. — E. WYLLYS ANDREWS, M. D.
FREDERIC A. BESLEY, M. D. — WM. R. CUBBINS, M. D.

ON THE TECHNIQUE OF OPERATIONS UPON THE HEAD AND NECK. By George W. Crile, M. D.

The author limits his paper, in the outset, to the control of hemorrhage. The various methods advocated in general are considered separately and grouped. For instance, the upright posture, temporary closure of the common or external carotid, and the use of hæmostats will give practically bloodless operations upon the face and jaws. The pneumatic suit is also recommended to keep the circulation supported.

In a scalp operation an elastic bandage of rubber drawn with moderate strength is advised, the ends of which may be tucked under the edge of the original piece.

Venous hemorrhage is remarkably lessened by the upright position, because the pressure is negative and the walls are better able to curl in upon themselves.

Of air embolism he has little fear, but advises the constant care of the blood-pressure, with suitable apparatus for raising it, should there be a fall.

In operations upon the Gasserian ganglion, the position is an angle of 45°, and both carotids are temporarily clamped; then the venous hemorrhage is controlled by pressure with small rolls of gauze.

All operations upon the jaws, tongue, pharynx, etc., should be undertaken only after the performance of a tracheotomy or intubation of the larynx, so that a perfect anæsthesia may be had. — *Annals of Surgery*, Dec., 1906. W. R. CUBBINS.

THE BONE METASTASES OF HYPERNEPHROMA. By Charles L. Scudder, M. D.

Dr. Scudder reports a case of the kidney, the first evidence of which was a metastasis in the upper part of the humerus; the only sign of the primary growth was an enlargement of the left kidney. He collected fifteen cases, and makes the following deductions: 1. A bone metastasis may be the first sign of hypernephroma. 2. A bone tumor in a middle-aged or elderly person should suggest a metastatic hypernephroma, for a primary bone tumor in elderly people is uncommon. 3. The bone metastasis from a hypernephroma may be the only metastasis. 4. A hypernephroma may exist for a considerable period without symptoms. 5. The kidney region should be palpated with great care in every case of bone tumor. — *Annals of Surgery*, Dec., 1906. W. R. CUBBINS.

CANCER OF THE GALL-BLADDER AND DUCTS. By J. Garland Sherrill, M. D.

The author calls attention to the frequency with which it has occurred in his practice, and quotes several others who have had the same experience. His review of the literature has been exhaustive, and a bibliography is attached to the article.

In his experience, out of twenty-five cases of disease of the gall-bladder and ducts which have come to operation, there have been four cases of carcinoma and two more suspected, which makes a high percentage.

Cancer of the ducts is usually accompanied or preceded by gall-stone history. The prognosis is bad, the spread being nearly always to the liver. The diagnosis is almost impossible without operation and sections of the gall bladder or ducts for microscopic examination.—*Annals of Surgery*, Dec., 1906. W. R. CUBBINS.

FRACTURE OF BASE OF SKULL. By L. R. G. Crandon, M. D., and Louis T. Wilson, M. D.

The authors report an analysis of 530 cases from the Boston City Hospital, with particular reference to the prognosis and treatment.

The most frequent cause was falling; it being as high as eighty per cent of the whole, and one half the falls were backward. The remaining twenty per cent were due to assaults, injuries, etc.

The symptoms of most value were bleeding from the ears, either one or both. This was present in seventy-four per cent of the cases.

The pupillary reaction was of value from a prognostic standpoint, in that, without reaction, the result was nearly always fatal. It was not possible to show any relation between the side most severely injured and the dilated pupil.

Bleeding from the nose or mouth must be carefully considered before one can say that the base has been injured.

Pulse and respiration are of little value. Most cases had a normal temperature on entrance, except alcoholics and those in great shock. In these it was subnormal. A rapid rise gauges the severity of the cerebral or meningeal lesion.

Treatment should be rest in bed, with the careful cleansing of all the cavities with moist swabs. Operative procedures should only be undertaken when there are definite signs of hemorrhage.

The immediate prognosis is usually considered in the first forty-eight hours. Death during this period is usually due to severe laceration of the brain substance, especially in the region of the fissure of Sylvius, or to acute meningeal infection.

Although prolonged unconsciousness is not a grave symptom in itself, yet when the pulse and respiration grow worse during the unconscious period, then the outlook is very grave.

The prognosis from day to day must be guarded, as the whole picture is liable to change at short notice and without warning.

Remote after-effects are very common, and cannot be studied too closely, for the disposition may change entirely or the memory may be affected.

The patients are frequently compelled to give up their occupation and seek some simple task.—*Annals of Surgery*, Dec., 1906.

WM. R. CUBBINS.

THE RESULTS OF OPERATIVE TREATMENT OF VARICOSE VEINS OF THE LEG BY METHODS OF TRENDELENBURG AND SCHEDE. By Robert T. Miller, Jr., M. D.

1. Varicose veins of the leg are not an incident of senility; the condition is rather a disease of young and middle-aged individuals, over one third of the cases appearing before the thirtieth year and two thirds before the fortieth year.

2. From an ætiological standpoint, there are two classes; viz., inflammatory and non-inflammatory. The inflammatory group includes about one third of all cases, phlebitis occurring as a complication or sequela of pregnancy, post-operative convalescence, or an acute infection, among which typhoid fever is the most frequent. The pathology of the non-inflammatory group is obscure.

3. In 128 cases, the right and left legs are affected in about equal proportion; over one half of the cases are bilateral.

4. Trendelenburg's operation cured 78 per cent in a series of 41 cases; this is about the result generally reported. In the first four post-operative years, 89 per cent were cured; in the fifth to the eighth post-operative years, but 63 per cent were cured. The tendency to recurrence of symptoms increases as the post-operative interval lengthens.

5. Schede's operation cured 33 per cent in a series of 9 cases. Of 2 cases, 2 years or less since operation, both were cured; of 7 cases, more than 2 years since operation, but 1 was cured. The tendency to recurrence of symptoms as the post-operative interval lengthens is much greater after a Schede than after a Trendelenburg operation.

6. Division between ligatures of the saphenous veins does not insure permanent occlusion. The venous stream may be re-established in three ways; viz., dilatation of anastomoses around the point of division, 2 cases; formation of varices in the scar, 3 cases; or end-to-end anastomosis of the ligated stumps, 3 cases. The Schede operation is followed particularly by anastomosis of ligated stumps. Of 6 cases examined, 3 showed an intact saphenous vein running through the scar.

7. Functional restoration of the saphenous vein may be, but is not always, accompanied by recurrence of symptoms.

8. Resection of 8 cm. or more of the saphenous vein at the saphenous opening made through a generous transverse skin incision, is to be preferred to simple division of the vein.

9. Post-operative pulmonary embolism is rare, but has occurred between the fourth and thirteenth days. The onset is marked by sudden dyspnœa, cyanosis, tachycardia, and signs of collapse, accompanied by rise in temperature. The symptoms may subside rapidly, may persist with the physical signs of pulmonary infarct, or may be followed immediately by sudden exitus.—*Bulletin of Johns Hopkins Hospital*, Sept., 1906. WM. R. CUBBINS.

DISLOCATION OF VERTEBRA IN LOWER CERVICAL REGION FOLLOWED BY SYMPTOMS OF COMPLETE SEVERANCE OF THE SPINAL CORD; LAMINECTOMY; LATER, PARTIAL RESTORATION OF FUNCTION. By William C. Krauss, M. D., Buffalo, New York.

Dr. Krauss reports an exceedingly interesting case of injury to the spinal cord at the sixth cervical vertebra, in which the substance of the cord had been pressed out, leaving it flattened, with the supporting structures intact.

The symptoms, which were at first those of a complete severance, have changed until the patient is at present able to officiate as a telegraph operator.

The greatest difficulty the patient experiences at present is a marked ataxia and an inability to stand alone without falling backward.

Dr. Krauss believes that the cord has regenerated since the injury.—*Annals of Surgery*, Nov., 1906.

WM. R. CUBBINS.

THE SIGNIFICANCE AND CURABILITY OF TUBERCULOSIS OF THE BLADDER. By Dr. Th. Rovsing.

This paper is a complete clinical *résumé* of the extensive experience with tuberculosis of the bladder of the Danish Surgeon, Rovsing, than whom it is questionable if any other surgeon has had more extensive experience. Rovsing's deductions are based on 56 cases. The gross lesions in all these cases, as well as the type of operation and the operative result, are pictured on a unique chart, which is so condensed that it takes up barely half a page.

Ordinarily, tuberculosis of the bladder is secondary to that of the kidney; rarely, it may be secondary to a genital tuberculosis, and still more rarely is the lesion primary in the bladder itself. To attempt to eradicate the lesion in the bladder without first removing the focus in the affected kidney, is a hopeless task. On this account, it is of supreme importance, in every case of tuberculosis of the bladder, to determine definitely whether or not one or both kidneys are affected. In determining this point, no reliance should be placed on simple cystoscopy, on ordinary urine examination, or on the evidence afforded by the various types of separators or segregators. Simple cystoscopy is of no use, because the lesion in the bladder is often on the side opposite to the lesion of the affected kidney. Urine separators and segregators are practically worthless, because of their unreliability. Only one means exists of reaching reliable conclusions, and that means is ureter catheterization. Urine collected by means of the catheter from each kidney gives reliable information in practically all cases, and yet it is possible that even this method may furnish misleading *data*. For example, Rovsing has seen cases that furnished tuberculous urine from both kidneys, although only one kidney was affected. Such an occurrence can be explained in only one way. The affected kidney pours tubercle bacilli into the bladder, from which they gain entrance into the opposite ureter, from which they are recovered by the ureter-catheter. Such cases can be cleared up, as regards diagnosis, by double exploratory nephrotomy. In cases where the bladder is so markedly ulcerated that cystoscopy is out of question, no attempt at a cure should be instituted until both kidneys have been explored.

It may be stated as a general rule, that, after the diseased kidney is removed, the bladder tuberculosis heals spontaneously. If, however, the lesion in the bladder has advanced very far before the kidney is removed, it may be necessary to apply local applications to the vesical lesion. In such cases, Rovsing proceeds as follows: The bladder is irrigated with some bland solution to clear it of pus and blood, and then a six-per-cent solution of warm carbolic acid is injected, and allowed to remain in the bladder for three to four minutes. This solution usually returns as a milky mixture. These injections are repeated three or four times, until the solution returns fairly clear. After the final wash, the patient is given a suppository containing one third of a grain of morphine.— *Arch. f. klin. Chir. bd.* lxxxii, h. 1.

M. G. SEELIG, M. D.

LUNG COMPLICATIONS AFTER LAPAROTOMY. By A. Laewen.

Laewen embraces under the term "lung complications" the following conditions: Lobar, lobular, aspiration, and hypostatic pneumonias, pulmonary embolism and infarct, and the several varieties of pleurisy. The author's conclusions are based upon 9,755 operations, among which number there were 1,829 laparotomies. Pneumonia developed in 1.8 per cent of all the cases operated upon, and in 5.4 per cent of the cases subjected to laparotomy. The mortality of post-operative pneumonia in this series was 63 per cent, the autopsies disclosing that one fourth of all the fatal cases were due to aspiration pneumonia.

Laewen believes that malignant disease is a strong disposing factor, particularly malignant disease of the stomach. In a series of twenty-five gastrostomies for œsophageal cancer, post-operative pneumonia occurred nine times, whereas pneumonia did not follow any of the operations done for benign stricture of the œsophagus. Unquestionably, the interference with respiration and expectoration that always follows abdominal section has much to do with the subsequent development of pneumonia, and it is to these two factors that Laewen attaches most importance. He believes, however, that an equally important ætiological factor lies in the aspiration of saliva, mucus, or vomitus. Pulmonary embolism, with consequent infarction of the lung, he believes to be a factor of only secondary importance in the causation of post-operative pneumonia.— *Beit. z. klin. Chir., bd.* lii, *h.* 2. M. G. SEELIG.

LARYNGO-FISSURE AND THE RADICAL OPERATION FOR LARYNGEAL CANCER. By M. von Bruns.

Von Bruns believes that thyrotomy should be the operation of choice in all cases of laryngeal cancer, provided the neoplasm is confined to the soft parts of the interior of the larynx, and provided the growth is not too much spread out over the interior. Von Bruns himself has performed

the operation ten times, accomplishing seven cures that have lasted from two to fifteen years. The functional results are excellent. In 114 cases reported since 1890, the mortality following the operation is 9 per cent, the percentage of recurrence is 22 per cent, and the percentage of cure is 48 per cent.

The technique of the operation is as follows: A preliminary injection of scopolamine-morphine is given one hour before the operation. Under local anæsthesia (novocain) an incision is made in the middle line of the neck, over the larynx. The larynx is opened by incising the thyroid and cricoid cartilages and then the laryngeal mucous membrane is brushed with a solution of novocain-adrenalin. Unless there is a marked tendency to bleed freely, there is no need to perform a preliminary tracheotomy. The head should hang over the edge of the table. It is well to use a head-mirror, or some other form of artificial light, by the aid of which, the neoplasm is excised down to the perichondrium, the excised area being touched with the electrocautery, or dusted with iodoform-powder. The larynx is then sutured, as is also the skin wound, except at the lower part, where a loose tampon is packed. Tracheotomy-tubes are dispensed with entirely. Within ten to fourteen days, the wound is completely healed.— *Deutsch. Med. Woch.*, 1906, No. 38.

M. G. SEELIG.

WOUNDS OF THE DIAPHRAGM, STOMACH, AND SPLEEN. By Dr. Karl Borzeky. (From the Budapest Surgical Clinic; Prof. E. Reczey, Director.)

Borzeky reports two cases of wounds of the diaphragm, one a stab wound which recovered after a transpleural operation under Sleich infiltration anæsthesea, the other a gun-shot wound of the diaphragm and stomach, this latter case dying after laparotomy.

Borzeky points out that a wound of the diaphragm is not an injury of an isolated cavity, but, that an abnormal opening between the abdomen and thorax always exists. Wounds upon the left side are particularly dangerous, as the liver, in a measure, protects the right side from the forcing of abdominal organs into the chest.

Borzeky believes that, when practicable, an abdominal incision affords a much better opportunity for repair of the wound of the diaphragm, as a thoracotomy allows but a limited exposure, even the finger being able to palpate but a small part of it. Laparotomy permits a wide exposure, and also renders possible the finding of any coincident injury to abdominal organs. As to the necessity of laparotomy for diagnostic purposes in many cases, five cases are quoted from Neugebauer, in which the diagnosis of wound of the diaphragm was not made before the abdomen was opened; also, thirty-six from Schmidt, where autopsy revealed the diaphragmatic injury.

In many wounds of the diaphragm, particularly gun-shots, the stomach also is injured. Borzeky points out the ease with which, when a perforating wound of the stomach renders suturing on the posterior wall of that organ imperative, the posterior wall may be exposed by making an opening in the ligamentum gastrocolicum and drawing the stomach through it. This, however, suffices only in those wounds which are near the greater curvature. Those near the lesser curvature may be reached through the omentum minus.

The spleen may be wounded by a bullet which has already passed through the stomach, or by a projectile coming from behind through the back muscles, or from in front through the liver and ligamentum hepatogastricum. Stab wounds and rupture from blunt force also occur.

The diagnosis is only to be positively made after laparotomy. The prognosis is regarded as unfavorable. Borchordt's fifteen cases of which ten died, and Von Schroter's four, of which three died, being quoted. Borzeky favors suturing of wounds of the spleen or tamponade. But little is said of splenectomy. In a case reported in the article, the hemorrhage was controlled by suture. *Uebe Verletzunzen des Zwerchjelles, des Magens und der Bouchspecichel Drüse. Beiträge zur klinischen Chirurgie*, vol. xlviii.

W. C. DANFORTH, M. D.

DIAGNOSIS AND OPERATION OF CARCINOMA OF THE UPPER PART OF THE RECTUM. By F. Brüning. From the Surgical Division of the Feriburg Deaconess Hospital, Professor Goldmann, director.

Brüning describes the case of a man of 47 with a circular carcinoma of the rectum causing stenosis, lying so high that the diagnosis was made by rectoscopy. A combined abdominal and sacral operation was done with circular enterorrhophy after resection of the tumor. Patient recovered, although an enterostomy was required on account of ileus.

In the discussion of the diagnosis, Brüning brings out the following points:

1. *Digital Examination.* In a tumor lying high in the rectum, it is advised to examine in the standing position, causing the patient to "press down" as much as possible. This maneuver renders palpable many tumors otherwise out of reach of the finger.

2. *Rectosigmoidoscopy.* The author favors the rectoscopy with insufflation of air, after the method of Strauss. It is also reccommended in all cases first to make a digital examination, in order to ascertain whether the sphincteric region is involved. Brüning states that in almost every case a view may be obtained up to 25–30 cm. above the anus. Pain only is caused when the air dilatation is made with too much force. A portion may be excised for diagnostic purposes if desired. It is stated that a diagnosis may at times be made by rectoscopy when everything else fails.

Operation. 1. The method of Gaudier and Quenu. An artificial anus is made in the sigmoid, and then the entire rectum, including the anus, resected by the sacral route.

2. Abdomino-anal resection, first brought out by Mannsell. The sigmoid and rectum are freed by opening the abdomen first, and the tumor is invaginated and drawn through the anus and resected. Circular enterorrhophy and reposition.

3. Abdomino-sacral resection (Kraske). Laparotomy and freeing of the tumor and resection of the gut by the sacral route.

As to the relative value of these methods, the following is stated:

For the first method the points in favor are: 1. Avoidance of fæcal soiling of the peritoneum. 2. A considerable degree of protection against recurrences, the procedure being radical. Against this method stands the objection of a permanent artificial anus.

In favor of the second procedure: 1. Resection can be made above the anus. 2. Fæcal infection is practically excluded. Disadvantages: 1. A very thorough freeing of the sigmoid and gut must be done, which increases the danger of gangrene of the gut. 2. In some cases, invagination of the tumor is very difficult or cannot be done at all.

In the third method, on account of the resection of the sacrum a wound infection may readily occur. It may, however, be done in all cases, and does not demand much freeing of the gut. The two last methods permit a normal defecation, which the first does not.

As to the mortality of these methods the following figures are quoted:

1. 38 cases. Mortality, 45.4 per cent.
2. 9 cases. Mortality, 66.6 per cent.
3. 25 cases. Mortality, 52.0 per cent.

These combined methods, therefore, have a very high mortality. The simple operations for rectal cancer have only twenty per cent mortality. In explanation of the high mortality in the combined operations it may be said that, comparatively speaking, the higher the tumor is situated, the greater the danger in removing it. There are also but few operators who have had opportunity to do the operation many times.

Brüning believes the third method to be the best, giving the best functional result. Indications for the combined operation are noted as follows: 1. High-seated tumor; 2. Presence of infected lymphatics, as these can often not be removed from below; 3. An adherent tumor. — *Ein Beitrag zur Diagnose und Operation der hochsitzenden Most darmcarcinome. Beiträge zur klinischen Chirurgie*, vol. xlviii.

W. C. DANFORTH M. D.

TUMORS OF THE MESENTERY, WITH REPORT OF A CASE OF FIBROMA. By L. G. Bowers, M. D.

Dr. Bowers reports a case of fibroma that had its origin from a pedicle attached to the transverse mesocolon, so that the tumor was in the lesser omental cavity with firm adhesions to the posterior wall of the stomach. The tumor was removed, and the patient made a good recovery.

Diagnosis of the character and origin of the tumor could only be made by abdominal section. The other cases of tumors of the mesentery in the literature are collected and summarized. — *Annals of Surgery*, Dec., 1906. W. R. CUBBINS.

ABSTRACTS OF CURRENT LITERATURE

DEPARTMENT OF GYNECOLOGY

UNDER THE CHARGE OF

J. CLARENCE WEBSTER, M.D. — E. C. DUDLEY, M.D.
JOHN C. HOLLISTER, M.D. — F. W. LYNCH, M.D.

BEITRAG ZUR KENTNISS DES EPITHELOIDEN GEWEBES IN DEM GENITALAPPARATE DES WEIBES. By Dr. K. von Ulesco, Stroganowa of St Petersburg.

The author describes as epitheliod, i.e., epithelium-like-tissue, peculiar aggregations or groups of usually rather large, oval, or round, or octagonal cells with large nuclei, that frequently bear nucleoli. The protoplasm of these cells may be homogeneous or granular. It is sometimes yellowish from coloring matters of the blood that have been absorbed from extravasations near such cells, and it then imparts a yellow color to the tissue that is composed of them. The peculiar and important feature, as set forth by the author after much work with the microscope, is that this *epithelium-like-tissue* is found apparently out of place, i.e., in parts that belong to the connective tissue layer and are derived from the mesenchyme elements. This tissue has only a temporary existence, and is the result or expression of a reaction excited in normal tissues by some persistent irritation, (*Stabiler Reiz*). The latter may be engendered in connection with physiological processes, like menstruation and pregnancy, or by pathological conditions, such as the presence of extravasated blood or other aseptic foreign body, like the skeleton of a dead fœtus in a tubo-abdominal pregnancy; but most frequently by gonococcic infection, notably in the Fallopian tubes.

That these epithelium-like cells are not a part of true epithelium, but belong to the connective tissue, is proven by the presence of numerous thin walled blood-vessels among them, and by the fact that numerous small round mono-nuclear cells with large nuclei (known as lymphocytes) fill the intercellular spaces. The blood-vessels walls are often composed of only a single layer of endothelial cells, which are shown often merely by the rows of their nuclei. Under normal conditions this tissue occurs most regularly in the mucous membrane of the uterus during pregnancy, and is then known as decidual tissue. The author examined an unbroken gestation sac which was obtained in an extirpated myomatous uterus. Again, in the tensely hyperæmic mucous lining of the uterus which leads to the menstrual flow, retrograde metamorphosis predominates; but the author says that areas exist where the engorgement of the vessels does not lead to this breaking down of tissue, and there progressive conditions remain in force. These connective tissue cells of the mucous membrane grow vastly in size and multiply rapidly, judging from the kariokinetic figures, and compose groups of large cells closely fitted together, the cells being rich in protoplasm and bearing, large, round or oval nuclei with nucleoli. Occuring then in the uterus during menstruation, also, the decidual cell is not in itself a proof of pregnancy when found there.

In the ovary, also, this epithelioid tissue occurrs physiologically, in the corpus luteum spurum and verum. Rupture of the Graafian follicle is preceded by hypertrophy and hyperplasia of cells in the grandulation layer or theca folliculi interna. The cells are large with homogenous or granular protoplasm. They bear a large nucleus, and have numerous thin walled yessels between them. After rupture the follicle fills with blood (ex vacuo) and some of the cells of the membrana granulosa, which have filled their role, break down and together with the blood clot form a foreign body, which excites a reaction in the peripheral vessels and tissues of the follicle. Under this influence, the remaining cells of the theca interna grow vastly and multiply, and their protoplasm takes on a yellow hue from absorption of the blood pigment and other detritus within the follicle. The chemical reaction of this yellow grandular matter within the protoplasm of the cells of this lutein tissue, is the same as for blood pigment. These processes occur alike in the corpus luteum and spurum, which differ from each other only in size. The author says that it is well known that the corpus luteum verum occurs in sterile cases of fibroid uteri; and he found one in a case of vaginal section for chronic gonorrhœa of the tubes, where the woman had been sterile for twelve years after an abortion in the second month.

The author made extended microscopic examinations of twelve pathological cases and describes them in detail. He found this epithelioid tissue in the walls of a cystically degenerated corpus luteum that was found in an ovary which was removed along with a ruptured tubal pregnancy. He found it in an elephantiasis of the clitoris and labiaminora, in nests having a vessel lumen in the centre, and situated in old connective tissue which bore the evidences of long standing œdema. He found it in the connective tissue stroma of the mucous membrane lining a tube in which lay a long bone of a dead and old tubo-abdominal pregnancy, of which the bones of the skull and some long bones were found associated with a myomatous uterus, during hysterectomy. In nine other cases of quite evident gonorrhœal infection of old standing, he found this tissue, cells of which very closely resembled the decidual cells of pregnancy and those of corpora lutea, chiefly in the deeper strata of the hyperplastic mucous membrane of thickened Fallopian tubes; sometimes displacing the surface epithelial lining or flattening it, sometimes encroaching upon the muscularis, and sometimes constituting yellowish protuberances or nodules in the serous covering on the outside of the tubes.

Moreover, in cases which bore evidences of previous old infection, and presented ovaries with cysts, he found it in such portions of the cyst-walls as contained ovarian elements expanded in them. Of infectious agents it is the gonococcus chiefly, the author says, that by its enduring qualities gives risə to the growth of this tissue, which is decidedly phyagocytic in its nature, and sometimes develops large multi-nuclear cells, like the giant cells of tubercular nodules. In pregnancy, the author thinks, it has likewise a defensive function for the mother, by neutralizing the waste products of tissue metamorphosis of the fœtus.—*Monatschrift für Geburtshuelje und Gynecologie*, Jan. and Feb., 1907.

A. GOLDSPOHN.

PAPILLARY CYSTADENOMATA OF THE BREAST. By Greenough and Simmons.

The classification of benign breast tumors of Warren is first quoted.

I. Fibro-epithelial tumors.
  A. Fibrous type.
    Periductal fibroma.
    Periductal myxoma.
    Periductal sarcoma.
  B. Epithelial type (cystadenomata).
    Fibrocystadenoma.
    Papillary cystadenoma.
II. Hyperplasia.
  A. Diffuse hypertrophy.
  B. Abnormal involution (cystic disease).

The following summary is quoted in full — the result of investigation of twenty breast-tumors of the papillary cystadenoma type:

1. They were single or multiple, involving the large ducts near the nipple, and composed of one or more cyst cavities, from the walls of which grew papillary outgrowths composed of fibrous tissue, stroma, and a luxuriant growth of duct epithelium in the form of irregular gland-tubules and polypoid projections.

2. Tumors of this character have been described by many names; viz., adenoma, duct-papilloma, duct-cancer, villous papilloma, cystadenoma intracanaliculare, proliferous cysts, etc.

3. They occur in the male breast as well as in the female.

4. They occur at all adult ages, and independent of trauma, marriage, or lactation.

5. They are usually painless.

6. They are generally situated near to or beneath the nipple.

7. They are usually of small size, but occasionally attain the dimensions of an orange.

8. They are of slow growth.

9. Their most characteristic symptom is the presence of a discharge from the nipple, which may be serous, but is usually bloody in character.

10. They do not cause enlargement of the axillary glands.

11. Fifteen per cent of the twenty cases in this series were associated with a form of cancer (adeno-carcinoma) of a relatively low type of malignancy.

12. Treatment demands the complete removal of the tumor, either by excision, or, if necessary, amputation of the breast.

13. Excision may be performed by plastic resection or by an areolar incision.

14. The association of cancer with papillary cystadenoma in fifteen per cent of the cases justifies the separation of this group from other fibro-epithelial tumors of the breast in clinical and pathological classification.—*Annals of Surgery*, Feb., 1907.

ABSTRACTS OF CURRENT LITERATURE

DEPARTMENT OF OBSTETRICS

UNDER THE CHARGE OF

C. S. Bacon, M. D. — Rudoplh W. Holmes, M. D.
C. v. Bachellé, M D. — Hugo Ehrenfest, M. D.

Eclampsia without Convulsions. By Dr. Schlutius.

Schlutius reports a case similar to the ones reported by Binder, von Esch, Schmorl, and others. His patient had suffered much with headaches during girlhood, and toward the end of pregnancy had, in addition, œdema of the legs, hands, and eyelids. Her eyesight, also, was so impaired, that at a distance of from 1½ to 2 m., she was unable to distinguish objects. Besides this, the amount of urine was diminished, and contained 4 - 5 per cent albumin, some bile, and casts.

During labor the patient perspired freely, was very restless, though her mind was clear. She vomited twice. She was unable to distinguish the pattern of the wall-paper in the room. Soon after the placenta was delivered, she began to groan and complain of feeling badly and became faint, whereupon the mucous membranes and face became blanched and the pupils dilated. The patient then became exceedingly restless, threw herself about the bed, and finally became comatose. Pulse was 120; temperature, 37.8°. As there was absolutely no hemorrhage, he believed it to be a post-partum eclampsia. After the coma, another period of restlessness occurred, and this, in turn, was succeeded by another period of unconsciousness, which lasted twenty to thirty minutes. The patient then awoke with a feeling of nausea, and, after vomiting, declared laughingly that now she felt better, which condition lasted from five to ten minutes, when a repetition of the attack occurred. In spite of the sweat-baths, the condition continued for several hours. The eye-grounds were examined and found normal, as was also the pupillary reaction. Such attacks recurred at increasing intervals for five days, when they ceased. During this time the amount of albumin decreased to 0.5 per cent, increased in quantity, and became clear. The heart returned to its normal size, and the whole condition improved.

Whether this should be termed eclampsia without convulsions, or perhaps coma uræmicum parturientis, he leaves to the reader, but believes that it may properly be classed as a case in the former category. *Zur Eclampsia ohne Krämpfe. Zentralblatt fur Gynäkologie*, 1907, No. 4.

C. v. Bachellé.

The Lower Uterine Segment. By L. Aschoff.

In a very interesting and undoubtedly plausible manner, the writer attempts to solve the vexed problem of the lower uterine segment. The striking difference of opinion among leading authorities whether it is to be considered as a part of the cervix or of the uterine body, according to Aschoff, is simply due to the fact that we do not have any exact definition either of the term "cervix" or of "lower uterine segment." The macroscopical conception of the term "cervix" is not in accord with microscopical findings. Of course, for histological and logical reasons the word can be employed only with its macroscopical meaning. The clinician must call cervix that contracted portion of the uterus which resembles a "neck" and reaches from the external to the internal os of the cervix. The line of demarkation, between the typical cervical and uterine mucosa, however, lies from eight to ten millimeters below the macroscopical internal os. The microscope does not reveal any histological difference in the mucosa lying just above and below the internal os. The uterus may be divided into two sections, viz., body and cervix, for reasons of macroscopical appearance. But, from the standpoint of its histological construction, three portions should be differentiated: *Cavum uteri*, lined with a typical endometrium; *isthmus*, the upper part of the cervix, lined also with endometrium; and finally, *cavum cervicis*, the lower two thirds of the cervix, which are lined with the typical cervical mucosa. *Cavum uteri* and *isthmus* are separated by the internal os, which, more properly, should be called *Orificium internum anatomicum*, in differentiation from the *orificium internum histologicum*, which marks the boundary line between *isthmus* and *cavum cervicis*. This tripartition, which already has been suggested by Veit, Hartmann and others, in Aschoff's belief

would settle all controversy concerning the lower uterine segment, which corresponds to the *isthmus*. It is obvious that the *isthmus* will furnish a suitable nidus for the implantation of the fertilized ovum, or can participate in the formation of the placenta. (See the abstracts of papers of Bumm and Blumreich, and of Hartmann in SURGERY, GYNECOLOGY AND OBSTETRICS, Nov., 1906, vol. iii, p. 718.) *Das untere Uterinsegment. Zeitschr. f. Geb. u. Gyn.*, bd. lviii, h. 2, p. 328. HUGO EHRENFEST.

THE SECRETORY FUNCTION OF THE EPITHELIUM OF THE AMNION. By Dr. Ludwig Mandl.

In a previous paper, Mandl and Kreidl (*Monatschr. f. Geb. u. Gyn.*, bd. xx, h. 4), by means of histological examinations of the amnion of pregnant rabbits, had substantiated a theory of Polano, based entirely upon biological experiments, that the amniotic epithelium plays an important role in the production of the amniotic fluid. The striking similarity between the histological appearance of the amniotic epithelium and other epithelium whose secretory function cannot be doubted, justified the assumption that the amniotic is a secretory epithelium. Independently of Mandl and Kreidl, very similar experiments and investigations were made by Bondi, which led to identical conclusions (*Zentralbl. f. Gyn.*, 1905, No. 35). Considering the results of Mandl's and Bondi's investigations concerning the secretory function of the amniotic epithelium in animals as convincing, Polano continued these researches on the amnion of human placentas. He concluded that the human amnion, also at the end of pregnancy, shows the characteristic of a secretory epithelium.

In a rather ingenious manner Mandl attempted to bring further proof for his theory by artificially producing in the amnion an exaggeration of the characteristics of a secretory epithelium.

Bruno Wolff (*Arch. f. Gyn.*, bd. lxxi, h. 1.) succeeded in producing an acute hydramnios by extirpating both kidneys of pregnant animals. In repeating these experiments and modifying them by injecting phloridzin into the nephrectomized animals, Mandl could prove that the rapid increase in the amount of amniotic fluid, to a small degree, is due to an augmented secretory activity of the fœtal kidneys, actually, however, must be caused by an enormous stimulation of the secretory function of the amniotic epithelium. The histological examination of the amnion of such nephrectomized animals, examined from 24 to 48 hours after the operation, demonstrated the correctness of the author's argumentation. The histological pictures typical of a secretory epithelium in this amnion are seen in a decidedly exaggerated form, and thus no doubt is left concerning the role played by the amniotic epithelium in the origin of the amniotic fluid. *Weitere Beiträge zur Kenntnis der sekretorischen Thätigkeit des Amnionepithels. Zeitschr. f. Geb. u. Gyn.* bd. lviii, p. 249.

HUGO EHRENFEST.

LABOR AFTER SYMPHYSIOTOMY AND PUBIOTOMY. By K. Baisch.

The fact that several records have appeared in literature of spontaneous deliveries occurring subsequent to symphysiotomies has led to the belief that this operation results in a permanent enlargement of the pelvis. Just at the present time, while an attempt is made to decide upon the respective advantages of symphysiotomy and pubiotomy, by some authorities — e.g., Zweifel — emphasis is laid upon the great number of spontaneous deliveries observed after symphysiotomy. It is interesting to note that French obstetricians always doubted the reliability of these observations. In an attempt to settle this question, Baisch collected from the literature since 1776 all the records of confinements subsequent to symphysiotomy. He subjects these reports to a very logical critical investigation, and comes to conclusions which certainly will effect a radical change of the prevalent view. Of all the one hundred patients, only nine subsequent to symphysiotomy gave birth at full term to normally sized children, who either were born spontaneously or could be extracted by means of the forceps or after version had been performed. But in eight of these nine patients the recovery from the symphsiotomy had been a most tedious one, being complicated by suppuration and resulting in a deficient restoration of the symphysis (Schlottergelenk). Only one of the nine women made a prompt recovery. In all the other (91) instances in which a child was born spontaneously or extracted by means of version or forceps, it undoubtedly was smaller than the one which necessitated symphysiotomy. It, therefore, can be stated that the assumed permanent enlargement is, almost without exception (only one in one hundred) obtained by a most undesirable suppuration resulting in the formation of a loose joint between the pubic bones, or in other words, a spontaneous confinement after symphysiotomy can be expected only in the presence of a much smaller child or when the pubic bones have failed to unite.

Up to the writing of this paper the literature contains seven records of confinements subsequent to pubiotomy. In three of them the same operation had to be repeated; in the other four the children were born spontaneously, but in all four instances the babies were smaller than those which neces-

sitated pubiotomy. So it seems fair to conclude that the assumption of a permanent enlargement of the contracted pelvis after pubiotomy is just as erroneous as that concerning symphysiotomy. *Geburten nach frueheren beckenerweiternden Operationen. Hegar's Beiträge zur Geb. u. Gyn.*, bd. xi, h. 2, p. 236.

HUGO EHRENFEST.

A FULL-TERM OVARIAN PREGNANCY. By D. Popow.

The author describes a full-term ovarian pregnancy which was terminated favorably for mother and child by operation. He draws the following conclusions from an anatomical study of the case:

1. The anatomical diagnosis of a left-sided ovarian pregnancy was based upon the determination of the normal left Fallopian tube, and the direct connection of the left ovarian ligament with the gestation-sac; also, on the presence of remains of the left ovary in the anterior wall of the gestation-sac, and on the close relation to the ovary of the infundibulo-pelvic ligament in which the vessels were strikingly developed.

2. The left ovary, which was transformed into a thin disc, had an intimate relation and a close attachment to the placenta, the villi of which were found between fibrinous masses and yellow cells of corpus luteum verum, and the altered adjacent ovarian stroma.

3. The presence of ovarian tissue is determined by the occurrence of included embryonal epithelium, the occurrence of degenerated primary and developing follicles, remains of corpora lutea and ruptured follicles in the form of corpora albicantia.

4. The left ovary showed the following histological changes in relation to the pregnancy: Definite pronounced hyperæmia, serous infiltration of the tissues, hypertrophy of the cell elements of the intercellular tissue, and distinct transformation of the cells of the tunica interna folliculi of the early and the developing follicles into corpus luteum cells.

5. The presence of the embryonal tubules of the Wolffian body were of assistance in determining the relations of the broad ligament and mesovarium. The flattened form of the left ovarian ligament was continuous with the left ovary, and contained hypertrophied muscle-fibers.

6. The left tube, on account of hypertrophy of the cells of the muscular layer, hyperæmia, and serous infiltration, was thickened; and the mucosa of the middle portion was changed to decidua.

7. The placenta was thin and covered an extensive area in the gestation-sac; it had distinct lobes and velamentous insertion of the cord. The placental tissue showed numerous old and recent blood extravasations resulting from disturbances of the circulation; besides, there were cystic new formations due to adhesions between neighboring villi, and degeneration of Langhans cell-layer.

8. The peculiarities in the structure of the placenta consisted in limited distribution of the villi, which were poor in embryonal substances, and therefore of small diameter. The vessels of the villi were markedly dilated, indicating disturbed circulation. The villi lying in the border of the ovary and in the fibrinous wall of the gestation-sac were surrounded by syncytium and trophoblast. Nowhere were decidua-cells in evidence.

9. The membranous wall of the gestation-sac consisted of fibrin layers, with remains of pseudo membrane in the form of fibrous structures, and showed, in places, well-marked round-cell infiltration.

10. The fœtus was a full-term male with pesquinovarus (talipesquinovarus).

11. The treatment (surgical) consisted in total removal of the products of conception (fœtus, gestation-sac, and placenta) by laparotomy.

12. Extirpation of the gestation-sac, together with the placenta, was accomplished without considerable hemorrhage. The following technique was employed:

(*a*) Liberation of the upper part of the gestation-sac from surrounding adhesions to intestine, omentum, and other parts, to gain entrance to the gestation-sac and extract the child. Preliminary ligation of the vessels prevented hemorrhage during incision and enucleation of the sac.

(*b*) Injury to the placenta (located on the anterior wall) was avoided by an oblique incision of the sac.

(*c*) The placenta was clamped in situ to prevent its separation during the removal of the lower part of the sac and the usually fatal hemorrhage from this source avoided. *Russki Vratsch*, 1906, Nos. 27-29. *Abstract in Zentralblatt für Gyn.*, No. 39, 1906.

WM. B. FEHRING, M. D.

BOOK REVIEWS

THE PRACTICE OF OBSTETRICS. By American authors. Edited by Reuben Peterson, M. D., Ann Arbor, Michigan. Illustrated; 523 engravings and 30 full-page plates; text 1100 pp. Philadelphia and New York: Lea Brothers & Co. 1907.

Like the companion volumes in the Practitioners' Library, this work is designed to be practical, but theory, where it is the key to practice, has not been in any wise neglected by the ten eminent specialists who have collaborated upon this book.

To be sure, there are objections that might be urged against the multiple authorship of medical books, as a principle. For instance, it is not in the nature of things to expect in such a work the coherence, the sequence, and the unity of thought and purpose which characterize the product of a single mind with full control of the subject and a definite and well-maintained view of the objective point.

It is almost impossible, in a subject like obstetrics, where every chapter has a real necessity for encroaching upon its neighbor's territory, so to control the individual writers that contradiction or repetition will not occasionally occur, even under the most careful supervision or the most brilliant editorial scrutiny.

It is therefore quite surprising that one notices so few of these difficulties in the book before us, wherein quite a remarkable coherence and continuity of thought and purpose are maintained.

On page 153 the statement is made that the care of the breasts should begin early in pregnancy and should continue up to the labor, oil or ointment being applied during the last four weeks, while on page 292 it is advised to begin the care of the breasts from two to three weeks before labor, and oils are discountenanced as favoring bacterial growth. A similar inconsistency is found in regard to the use of ergot, on pages 258 and 630. The most evident example of repetition, a certain amount of which is unavoidable, is to be found on pages 100, 110, 152, 328, 329, where the subject of irritation of the bladder in pregnancy with frequent urination is repeatedly discussed.

Even a good thing becomes tiresome under such constant iteration, but in this instance we are inclined to question the correctness of any one of the assertions.

We know that the uterus has the same specific gravity as the intestines, and that it cannot, therefore, by pressure upon the bladder produce irritation of that organ. The frequent urination and the irritation are much more plausibly explained by the presence of the increasing pelvic hyperæmia and the changing conditions that are produced by the broadening and lengthening uterus in the utero-vesical septum.

Multiple authorship, however, is not responsible for all the contradictions, since on page 326 a writer makes the very wise and very just observation that ureteral compression is a theoretic ætiologic factor that is now almost entirely abandoned — a statement which one can thoroughly approve — while on page 354 the same writer uses this theory to support his ætiologic structure.

These matters are of minor importance and inconsequential if the work is to be used solely by practitioners, but in the hands of students it might lead to some confusion and some unjust criticism of an otherwise splendid piece of work.

There is also very much that might be said in favor of this joint authorship, whereby different portions can be picked out and assigned to specialists in those departments. Such advantages are well illustrated in the present work by the masterly chapters on the physiology of labor, the pathology of the placenta, decidua, chorion, amnion, and fœtus, and the chapters on the physiology and development of the ovum.

These chapters are replete with valuable and instructive material that is usually omitted, or so casually considered that their force is lost. In the present instance, these chapters command our admiration for an interest and completeness that is rarely equaled and never excelled in obstetrical literature.

In connection with the development of the ovum, an unusually exhaustive chapter is added on the development of the urogenital system, illustrated by the excellent plates of Kiebel, Kollmann, and Eberth.

The chapters on ectopic pregnancy and the pathology of the puerperium are systematic, complete, and authoritative, although it would seem better if in the chapter on puerperal sepsis, Pryor's treatment had received some recognition.

The chapter on the differential diagnosis between pregnancy and other possible conditions is well covered. The toxæmia of pregnancy is another very interesting chapter that is considered quite fully, although the credit for the influence which

the thyroid exercises upon the metabolism in pregnancy is given to Nicholson instead of to Lange, upon whose interesting experiments (*Zeitsch. f. Gyn. u. Geb.*, 1899) all of Nicholson's work is based.

In the operative work a statement which has passed for truth through many generations of text-books is again repeated; namely, that persistent mentoposterior positions are impossible of delivery. According to the evidence given in a paper published a year or so ago, in which seventy-five such cases were collected from the literature, it is shown that seventeen (22.6 per cent) were delivered unrotated, and with a loss of only one mother and four babies among the seventeen cases.

The chapter on the psychoses of the puerperium is also exceptionally complete and interesting.

The description of digital curettage is excellent, and much more uncommon in text-books than its importance would warrant. Too often this subject, without a technical description, is referred to in such an incidental manner that the reader gets an impression that the author does not really use the method which he condemns with such faint praise.

The illustrations are unusually good, numerous, and descriptive. About 125 of the pictures are reproductions from photographs made at the University of Michigan Maternity, and while they could be made somewhat more distinct if the backgrounds had been blocked out with opaque, yet they are quite satisfactory and very realistic. The other pictures have been most carefully and judiciously selected.

The proof-reading is open to some criticism, but, on the whole, the work is an authoritative presentation of modern obstetrics, written by most competent men in every department.

As a text-book it is thoroughly practical, and valuable to the student as well as to the active practitioner, and takes a rightful place among the best works on the subject.

CHARLES B. REED, M. D.

PLASTER-OF-PARIS AND HOW TO USE IT. By M. W. Ware, M. D. New York: Surgery Publishing Company, 1906.

In this little book of less than one hundred pages, the author describes quite fully the technique of all the various surgical uses of plaster-of-Paris. The text is divided into seven chapters devoted to the making of plaster bandages, the use of plaster-of-Paris in treatment of fractures, for making molded splints, its use in orthopœdic surgery and in dental surgery.

The seventy-two illustrations in the text are, most of them, excellent and a help to understanding the descriptions of technichal procedures. The author has attempted to cover too much ground in so small a space, and consequently some of the descriptions are not given in sufficient detail to be perfectly clear to the novice, and one familiar with plaster-of-Paris work will take exception to many dogmatic statements. As a whole, the book will be a help to the student or practitioner unfamiliar with the thousand and one ways in which the plaster bandage may be most conveniently used.

J. L. P.

ANATOMICAL NOMENCLATURE. With special reference to the Basle Anatomical Nomenclature (B. N. A.). By Lewellys F. Barker, M. D. With vocabularies in Latin and English. Two colored and several other illustrations. Octavo. Cloth, $1.00, net.

The Basle Anatomical Nomenclature — popularly referred to as the B. N. A.— is the result of an earnest, concerted effort to systematize and simplify a nomenclature which has grown in haphazard manner.

The expression "B. N. A." is a shorthand title for a list of some 4,500 anatomical names (nomina anatomica) accepted at Basle in 1895 by the Anatomical Society as the most suitable designations for the various parts of the human anatomy which are visible to the naked eye. The names are all in correct Latin, and have been selected by a group of the most distinguished anatomists in the world as the shortest and simplest available terms for the different structures.

This book of Dr. Barker's is particularly acceptable at the present time. The increase of scientific knowledge has been so marked, and the new anatomical names added to literature have been so numerous, that communications are often confusing. Indeed, the older text-books of anatomy present the same unfortunate condition.

A TREATISE ON ORTHOPÆDIC SURGERY. By Royal Whitman, M. D. Third edition, revised and enlarged. Illustrated with 554 engravings; 843 pp. Philadelphia and New York: Lea Brothers & Co. 1907.

This third edition of Whitman's excellent book shows an extensive revision of the last edition. New material and many illustrations have been added, and it now presents a volume of 843 pages, with the latest and most scientific *data* as to orthopædic surgery. Not only are the symptoms and diagnoses well discussed, but the methods of manufacture and application of splints and dressings are covered so completely as to be a satisfaction, not

only to the specialist, but also to the general practioner. This is particularly true in relation to disease of the spine. This completeness is again noted in the discussion as to the treatment of lateral curvature of the spine, where the exercises and methods of muscle-building are discussed at length. The volume is particularly rich in tabular statistics, which adds much to its scientific value.

Bier's method of treatment is given only scanty review.

A careful review of the subject of congenital dislocation of the hips, with an extensive discussion of the various methods of treatment, adds to the volume. On the other hand, the operative treatment of deformities arising as a sequence of disease of the nervous system deserves a fuller consideration than is found.

The book as a whole is one that it is a pleasure to recommend, both from a scientific and artistic standpoint.

A Manual of Midwifery. By Thomas Watts Eden, M. D., etc., Assistant Obstetric Physician and Lecturer on Practical Midwifery, Charing Cross Hospital, etc. London: J. & A. Churchill. 1906. Philadelphia: P. Blakiston's Son & Co.

This handy volume of about five hundred pages, octavo, occupies the middle ground between the quiz compend and the complete treatise. A volume like the one before us will be read by the student, and it will be sufficient, provided he has a proper course of lectures, of recitations, of manikin and laboratory work, and of clinics. It is to the student alone that the volume is adapted, as an adjunct to his school course. It is not full enough for the practitioner wishing to refresh his memory of obstetrical facts or to bring his knowledge up to the times. It is as much as the student will read in connection with his lecture course, and as much as he will properly study in preparation for his recitations. The book leaves nothing of importance untouched, but wastes no space in elaboration of detail.

The book expresses succinctly, but distinctly, our present knowledge of ovulation, menstruation, the corpus luteum, fertilization, and the implantation of the ovum, the development of the chorion and the placentation. Indeed, the description of the chorion is particularly clear and convincing.

The chapter on diagnosis of pregnancy states fairly the limitations within which probable diagnosis can actually be made, and does not give the student false ideas as to impossible refinements. In the reviewer's opinion, the author errs in not devoting enough attention to the management of pregnancy.

Albuminuria, eclampsia, and hyperæmesis gravidarum are considered in close relation to one another, which is rational when we consider their correlation ætiologically and therapeutically. The presentation of these forms of toxæmia, if such they are, is remarkably clear, and should be easily comprehensible to the student's mind. The author's suggestions as to treatment are conservative. He does not advocate dangerous degrees of accouchement forcé.

The chapter on ectopic gestation recognizes the recent advances in the subject.

The chapter on abortion and premature labor is complete, and is excellently illustrated with borrowed and numerous good original pictures. There seems to be a lack of information about the dangers of abortion, either induced or spontaneous, and there is very little about criminal abortion. In a book intended for, or that is at least likely to fall largely into the hands of, the somewhat irresponsible young medical student, this is, to my mind, a serious omission.

In enumerating the indications for the induction of abortion and premature labor, acute or chronic nephritis with history of eclampsia in a former pregnancy is given as one indication, and extreme degree of obstruction, when the alternative of Cæsarean section cannot be entertained, as another. The former does not appear to the reviewer as a valid indication, unless accompanied by signs of defective elimination progressive in character. As to the latter, there is no valid reason why the alternative of Cæsarean section cannot properly be entertained.

The phenomena and the mechanism of normal labor are well described. The pelvic measurements and those of the fœtus are given only in inches. For a work for which it is hoped to get many readers in this country, both English and metric systems should be employed.

The chapter on the management of normal labor is largely occupied, and properly so, with consideration of obstetrical asepsis and antisepsis. The antepartum douche is discarded. In our opinion, the author does not sufficiently discourage vaginal examinations during labor, although he does emphasize the importance of external palpation for diagnosis. He advises an immediate internal examination as soon as the membranes have ruptured, to see whether the cord has prolapsed. In the reviewer's opinion, this accident is so rare in ordinary vertex presentations, that there is more danger from infection when internal examination is made a routine practice at this period, than danger to the fœtus from unrecognized pressure upon a prolapsed cord.

The author very wisely decries any idea that the perineum must be "supported," stating that attention should rather be directed to the fœtal head than to the maternal perineum. He would permit the introduction of a finger into the rectum in order to draw the face and chin through the vulvar orifice at the last — a practice better honored in the breach than in the observance. He advises against the tendency, too common among young obstetricians, to too much meddling during the third stage by efforts at expression or by passing up the hand after a slight delay. The management of posterior positions of the occiput is given far less attention than its importance demands.

It is a disappointment to find that the author advocates the use of the dangerous and barbarous blunt hook for bringing down a difficult breech. He properly advises the use of the forceps to the after-coming head when the Mauriceau digital method fails to give speedy results.

His remarks on the new-born child are, in the main, sound. He dismisses, however, the question of clothes with the statement that such a matter is not likely to be one about which the medical man is consulted.

The axis-traction forceps, and especially those of the type of Milne-Murray, are recommended. The posture of the woman on her left side is apparently assumed by the author to be the correct one, although it is seldom employed outside of the United Kingdom. With the present perfection of catgut, it seems strange that silk and silkworm-gut should be recommended for the suture of the uterine wall in the Cæsarean operation.

The book is of handy size, is well printed on good paper, and is finished with a good working index. HENRY F. LEWIS.

THE UTERO-OVARIAN ARTERY. By Byron Robinson, B. S., M. D., Chicago: E. H. Colegrove & Co., 1907.

One has only to read this admirable little monograph to understand the infinite pains and philosophical capabilities of its author. The impression is very forcibly conveyed to one's mind that the thoroughness with which the work has been done practically closes research in this particular connection. It is the finishing-stroke of a master, and settles for all time the character of the blood-supply to the uterus.

The numerous drawings and diagrams must not be construed as a detriment to the work, yet diagrammatic representations are not commendable where exact anatomical illustrations are so clear and sharp as in this connection.

The accomplished author is censured for introducing cuts from Hyrtl, Nagel, and others, where his own illustrations are more to the point. Furthermore, the work is an original monograph, and not a compilation.

Professor William E. Holland of the Illinois Medical College has named the utero-ovarian artery, "the circle of Byron Robinson." Perhaps this should be omitted, as it is not in conformity with the spirit of the new anatomical nomenclature. Men of science delight to honor those to whom honor is due, and our love and admiration for these men will always call out such expressions as "The circle of Willis," "The triangle of Scarpa," "The canal of John Hunter," and "The circle of Byron Robinson."

Perhaps the most practical and important factor in these inversofixations of the utero-ovarian artery is what is known the world over as "Byron Robinson's olegemic uterine zones." These zones are useful in Cæsarean section, bisection of the uterus, endometrectomy, and myomectrectomy. They explain the limited loss of blood in elective lines of uterine incisions.

A new feature in anatomical research has been introduced by the author, and all research students in anatomy should remember it with lasting gratitude. This is the filling of vessels and cavities with metallic substances and then employing the X-ray. It means the end of freehand anatomical drawing in showing these structures. A photographic representation of a tissue is absolutely accurate.

New and very striking ideas are shown in Figs. 101 and 103. These are sections of the uterus made every half-inch, and show the internal circulation to a nicety. The author deserves the lasting thanks and gratitude of gynecologists and anatomists for his fifteen years' of tireless labor.

The corrosive dissection of tissues has been utilized by Byron Robinson, and is producing such wonderful results as his demonstrations on the exsanguinated renal zone of Hyrtl. "Byron Robinson's cervical loop" and "Byron Robinson's ovarian vascular circle" are synonyms that will be handed down to succeeding generations of anatomists as monuments of a great man possessed of indefatigable energy.

J. F. BURKHOLDER, M.D.

A TEXT-BOOK OF OBSTETRICS. By Barton Cooke Hirst, M. D. Philadelphia and London: W. B. Saunders & Co.

Since 1898, when Hirst's *Text-book of Obstetrics* first appeared, edition after edition has been demanded, until the fifth now lies upon the reviewer's table, carefully revised, and presenting a beautiful

letterpress, together with 767 illustrations, of which 40 are in colors.

In the space allotted to this review it would be difficult to enumerate the many excellencies of the book, and while it may seem invidious and carping, it is certainly simpler, under the circumstances, to call attention to the rare and by no means serious imperfections that have impressed the reviewer.

To particularize, it would seem to the reviewer that too little emphasis has been placed upon the method of implantation of the ovum upon the uterine wall as revealed by Peter's ovum. The facts, to be sure, are mostly set forth, but in such an unimportant and casual way, as compared with the obsolete Hunterian theory, that much of the significance of the information is destroyed. On the other hand, the importance of the cervix and the suctorial power of the uterus in the sexual organism, although supported by analogies, would appear, in the light of our present knowledge, to be somewhat overaccentuated.

Again, pyelonephritis of pregnancy has certainly attained in literature to the rank of a specific gestational complication, and yet the author, even under the less correct appellation of pyelitis, dismisses it in a few lines, briefly and inconsequentially.

In addition to slighting its importance as a factor in pregnancy, the author states that the disorder is most frequent in the puerperium, and, inferentially at least, that pressure upon the ureters is an important ætiological factor. Both of these statements are incorrect, although they are frequently seen in standard text-books. The literature quite easily demonstrates that pyelonephritis is far more common in pregnancy than in the puerperium, and the improbability of ureteral compression as a common ætiological factor would be quite obvious if the conditions were attentively examined. The involvement of the kidney substance, as well as the pelvis, in the pathological process results from its toxæmic ætiology, and makes the term "pyelitis" entirely inadequate to describe the condition.

Furthermore, the frequently unilateral character of the disease and the diagnostic points, which would be extremely valuable to the student, are nowhere touched upon.

While considering the urinary organs, it might also be said that the uterus has the same specific gravity as the intestines in early pregnancy, and could not cause irritability of the bladder by pressure, as the text-book states. This irritability of the bladder in early pregnancy is due to the change in the relations and in the blood-supply in the tissues connecting the bladder and uterus, and is the result of uterine expansion and development, and pressure, *per se*, is in no way responsible.

The author also adheres to and reiterates the discredited and impossible theory that the ischuria and other urinary difficulties in cases of incarcerated retroflexed uteri are due to compression of the urethra and the neck of the bladder. This theory, also, has been entirely discredited, and supplanted by a more rational explanation.

It is surprising, also, to find that a 1-4000 bichloride solution is recommended in several places as an intrauterine douche. While possibly innocent in skillful hands, it is, in general, an unsafe procedure, and should be discountenanced while safer and more effective agents can be obtained.

Turning to the mechanism of delivery, one sees that "Presentation of the Greater Fontanelle" is the title under which the author considers the military position which has authoritatively received the far more descriptive designation of "transverse arrest" or "deep transverse arrest" when the head is on the pelvic floor.

The introduction of another name in the place of one that is widely known and well established, without very exceptional reasons therefor, is confusing and disorganizing; besides which, no adequate description is given of this anomalous mechanism, which occurs in about 1.25 per cent of all labors, and in 35 per cent of all cases where instrumental delivery is required. While on the subject of mechanism, it may be mentioned that the statistics have shown that 22.5 per cent of mentoposterior positions of the face have passed the outlet without correction. Hence the statement that in these cases the delay is absolute, in the absence of forward rotation, is hardly warranted by the facts, although it results probably in a safer rule of practice.

The operative work is uniformly excellent, with good and numerous illustrations which abundantly elucidate the text. One cannot but regret that such a fine piece of work should be marred by even a slight recognition of the irregular, unnecessary, and dangerous practice of applying forceps to the breech of the living child.

As much on account of the obstetrical fallacies that are omitted as for the truths that are contained in its pages, the book is a very successful *résumé* of the state of modern obstetrical knowledge and practice.

To write a book that is interesting, impersonal, judicial, and accurate is to attain the very height of scientific literary success, but many times the reader would be glad to receive, in place of a judicial comparison of variant methods and conditions, the definite personal and authoritative opinion of the writer, and in this respect, in the book before us, these very desirable features are most often very happily united.

The plan and the workmanship please the eye and the mind, while the scope, character, and scientific accuracy of the contents easily rank it among the first of text-books.

CHARLES B. REED, M. D.

BOOKS RECEIVED

THE PRACTICAL MEDICINE SERIES. Under the general editorial charge of Gustavus P. Head, M. D., Professor of Laryngology and Rhinology, Chicago Post-Graduate Medical School. Volume VIII — Materia Medica and Therapeutics; Preventive Medicine; Climatology; Forensic Medicine; edited by George F. Butler, Ph. G., M. D.; Henry B. Favill, A. B., M. D.; Norman Bridge, A. B., M. D.; Daniel Brower, A. M., M. D., LL. D.; Harold N. Moyer, M. D. Volume IX — Anatomy, Physiology, Pathology; edited by W. A. Evans, M. S., M. D.; Adolph Gehrmann, M. D., William Healy, A. B., M. D. Volume X — Skin and Venereal Diseases; Nervous and Mental Diseases; edited by W. L. Baum, M.D.; Hugh T. Patrick, M. D.; William Healy, A. B., M. D. Chicago: The Year Book Publishers.

WOMAN: IN GIRLHOOD, WIFEHOOD, MOTHERHOOD. By M. Solis-Cohen, A. B., M. D., Instructor in Physical Diagnosis, University of Pennsylvania; Visiting Physician to the Hospital for Diseases of the Lungs, Chestnut Hill; Assistant Physician to the Philadelphia General Hospital; Physician to the Children's Dispensary of the Jewish Hospital, Philadelphia. Philadelphia: The John C. Winston Company.

CONSERVATIVE GYNECOLOGY AND ELECTROTHERAPEUTICS. A practical treatise on the diseases of women, and their treatment by electricity. By G. Betton Massey, M. D., Attending Surgeon to the American Oncologic Hospital, Philadelphia; Fellow and ex-President of the American Electro-Therapeutic Association, etc. Fifth edition, carefully revised. Illustrated with 12 original full-page chromolithographic plates of drawings and paintings; 15 full-page half-tone plates of photographs made from nature, and 157 half-tone and photo-engravings in the text. Complete in one royal octavo volume of 467 pages. Extra cloth, beveled edges, $4.00, net. Philadelphia: F. A. Davis Company.

PRACTICE OF OBSTETRICS. The Practitioners' Library. Edited by Reuben H. Peterson, A. B., M. D., Professor of Obstetrics and Gynecology in the University of Michigan, Ann Arbor, Michigan Obstetrician and Gynecologist-in-Chief to the University of Michigan Hospital. Illustrated with 523 engravings and 30 full-page plates. Philadelphia: Lea Brothers & Co. 1907.

DISEASES OF THE LUNGS. A practical presentation of the subject, for the use of students and practitioners of medicine. By Robert H. Babcock, A. M., M. D., author of *Diseases of the Heart and Arterial System*; consulting Physician to Cook County Hospital, Mary Thompson Hospital, Hospital of St. Anthony de Padua and of Marion Sims Sanitarium, etc. With 12 colored plates and 104 text illustrations. Cloth, $6.00. New York and London; D. Appleton. & Co.

TUMORS INNOCENT AND MALIGNANT. Their clinical character and appropriate treatment. By J. Bland Sutton, F. R. C. S., Surgeon to and Member of the Cancer Investigation Committee of the Middlesex Hospital, etc. Fourth edition. With 355 engravings. Cloth, $5.00. Chicago: W. T. Keener & Co.

A STUDY OF THE HUMAN BLOOD-VESSELS IN HEALTH AND DISEASE. A supplement to *The Origin of Disease*. By Arthur V. Meigs, Physician to the Pennsylvania Hospital. With 103 original illustrations. Cloth, $5.00. Philadelphia and London: J. B. Lippincott & Co.

ESSENTIALS OF OBSTETRICS. By Charles Jewett, M.D., Professor of Obstetrics and Gynecology in the Long Island College Hospital, Brooklyn, New York. Third edition, thoroughly revised. 12mo, 413 pages, with 8 engravings and 5 colored plates. Cloth, $2.25, net. Philadelphia and New York: Lea Brothers & Co., 1907.

INDICATIONS FOR OPERATION IN DISEASE OF THE INTERNAL ORGANS. By Professor Herman Schlesinger, Extraordinary Professor of Medicine in the University of Vienna. Authorized English translation. By Keith W. Monserrat, M. D., F. R. C. S., editor, Surgeon to the Northern Hospital Liverpool. Cloth, $3.00. E. B. Treat Company, 1906.

TEXT-BOOK OF PSYCHIATRY. A psychological study of insanity. For practitioners and students. By Dr. E. Mendel, A. O. Professor in the University of Berlin. Authorized translation. Edited and enlarged by William C. Krauss, M.D., Buffalo, New York, President Board of Managers, Buffalo State Hospital for Insane; Medical Superintendent Providence Retreat for Insane; Neurologist to Buffalo General, Erie County, German, Emergency Hospitals, etc.; Member of the American Neurological Association. Crown 8vo, 311 pp. Extra cloth, $2.00 net. Philadelphia: F. A. Davis Co.